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TRANSACTIONS

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AMERICAN ENTOMOLOGICAL SOCIETY

VOLUME LXIV

A GENERIC SYNOPSIS AND GENERIC REVISION OF THE TRIBE DASYTINI OF NORTH AMERICA, NORTH OF PANAMA

(COLEOPTERA: MELYRIDAE)

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(Plates I and II)

The following contribution is offered at the present time, with the hope that it will aid in the advancement of our knowledge of the Melyrid Tribe Dasytini and, by facilitating the recognition of the generic position of species, render their identification less difficult. Later other studies will be presented, based on the numerous specimens of undescribed species, belonging to the genera, *Listrus* and *Trichochrous*. On account of the latter genus having become unweildy, it is necessary to restore to good standing the submerged genera of an older author, namely: *Byturosoma* and *Emmenotarsus* of Motschulsky; also, to recognize new generic groups that can be based on well defined characters, in large part those indicated by Thomas L. Casey, in his very excellent contribution to the knowledge of the Melyridae.[1]

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[1] Annals N. Y. Acad. Sci., VIII, p. 435, 1895. (Coleopt. Notices, VI.)

In 1921,[2] the author published some results of his studies in the genus *Listrus* and, gave some very pertinent suggestions as to the method of procedure to be followed, in order to recognize the many inconspicuous characters available for the proper differentiation of undoubtedly valid species. To do this it was necessary to establish a standard of magnification and to adhere to it in the examination of all the specimens. A magnification of 25 to 80 diameters is necessary and obtained by use of the monocular or binocular microscopes in combination with an one-inch, as well as an one-fourth inch objective and good illumination. Camera lucida outlines are important records for comparison.

In order that the student may be able to refer, with the least trouble, any given species to the proper tribe, the more or less epitomized synopses of the major taxonomic groups are given here, as follows:

FAMILY MELYRIDAE

Size small, found chiefly on flowers or foliage, a few on the ground about plants or on the sea beach. Head short, or at times more or less elongated behind or before the eyes. Antennae inserted upon sides of the front, generally before the eyes, the latter usually rounded and prominent. Mandibles small, sometimes larger. Labrum distinct, always more or less exposed according to the degree of retraction. Epistoma connate with the frontal apex, sutures obliterated or more or less indicated. Articulating membrane (spoken of by most authors as the epistoma), more or less coriaceous and flexible; in color varying from pale to black, smooth and without punctures or hairs. Prothorax not foliaceous at the sides. Sterna short, prosternum not extending between the coxae; procoxal cavities large, transverse and open behind. Elytra entire or abbreviated.

Abdominal segments five or six in number and free. Coxae conical and prominent. Anterior coxae variable, small to larger, transverse or not, contiguous and with distinct trochantin. Middle coxae contiguous, the posterior transverse, prominent internally, not covered by the femora.

Legs moderate in length, slender, occasionally stouter. Tibial spurs small and more or less indistinct to larger; the outer spurs of the protibiae and mesotibiae may be thickened and, even micro-unguiculate at apex in some species. Tarsi in our genera five-jointed, slender and more or less filiform; fourth joint entire. Claws usually with membranous appendages, that are variable in development and sometimes entirely absent.

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[2] Stanford Univ. Publ., Univ. Series, I, p. 139, 1921.

Synopsis of Subfamilies

Body with lateral extensible vesicles..................Subfam. Malachinae
Body without vesicles.
  Ocular facets coarse; maxillary palpi elongate, last segment large and securiform. Claws slender, appendages long, membranous, free, except at the extreme base (Pl. II, fig. 1)...............Subfam. Rhadalinae
  Ocular facets fine; maxillary palpi not elongate, terminal segment subconical or securiform in certain Central American species. Ungual appendages variable in form and attachment.......Subfam. Melyrinae

The subfamily Melyrinae is divided into two tribes as follows:

Tarsal claws appendiculate, except in a few species; basal segment of the tarsi as long as or a little longer than the second (Pl. II, figs. 21, 22 and 23.)..Tribe Dasytini
Tarsal claws not appendiculate; basal segment of tarsi slightly shorter than the second..Tribe Melyrini

Tribe Dasytini

Discussion

In the study now presented all of the genera of North America known to me are included, those of Mexico and Central America as given by Gorham[3] and Champion.[4] The taxonomic definitions are epitomized to the more essential characters. The author differs in his views regarding the epistoma in the Melyridae. LeConte and Horn in their Classification,[5] speak of a separate piece between the labrum and the front; considering that the epistoma is separated from the frontal apex by a transverse suture and, frequently in whole or in part membranous.

From careful observations made on large series of specimens of Melyrid species, it is quite evident that the true epistoma is more or less corneous and connate with the front and, in part of the species entirely undifferentiated; while in others the position of the sutures are indicated by a feeble impression, by a linear transverse ridge or difference in the surface plane; finally, in some species the epistoma is quite distinctly defined and the articulating membrane is also present. The author considers that the articulating membrane connecting the epistoma and labrum has undergone specialization, to permit of a more or less marked excursion of the latter. The membrane is smooth and without punctures or hairs. The epistoma bears both. The frontal integument is noticeably thin in part of the species and notably more chitinized in others.

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[3] 1886. Biol. Centr.-Amer., Coleopt., III, p. 324.

[4] 1913. Trans. Ent. Soc., London, p. 130.

[5] 1883. Smithson. Miscel. Coll., 507, (Helopini) p. 385.

The articulating membrane may be thin and distinctly membranous or feebly chitinized and subcoriaceous. The above facts can be determined by microscopical examination of specific series.

In *Pristoscelis grandiceps* LeConte (Pl. I, figs. 1 and 2) when the labrum is fully extended, the articulating membrane becomes a distinct entity; when the reverse is true and the labrum fully retracted the membrane disappears, except for a linear exposure that simulates a marginal bead. The epistoma is very short and completely undifferentiated from the frontal apex. Examine a series and the labrum can be observed in all degrees of retraction.

In *Amphivectura monticola* Blaisdell (Pl. I, fig. 5) the epistoma is evidently defined from the frons by a fine more or less elevated line. In the related species *Hoppingiana hudsonicus* LeConte (Pl. I, fig. 4) no such differentiation is present. In *Vectura longiceps* Casey (Pl. I, fig. 24), the epistoma is evidently defined from the frons by an arcuate suture and the membrane is also present.

For verification of the above homologous and analogous facts, in the Tenebrionid Series see the author's studies in the genus *Auchmobius*,[6] showing full exposure and complete retraction of the labrum beneath the corneous epistoma. Examine also the epistoma and labrum of *Centronopus* (Pl. I, fig. 21) and that of *Tarpela micans* Fabricius (Pl. I, fig. 25) of the present study and note that the articulating membrane is always visible, and at the same time a taxonomic character, spoken of as the " clypeal " membrane. When the epistomal apex is thin and membranous, it appears continuous with the articulating membrane; when the apex is more or less corneous, the membrane appears to arise from the inner apical lip or under the apical margin.

In the North American Dasytini the epipleurae, with one exception known to the author, are visible externally and more or less distinctly defined. In *Dolichosoma foveicollis* Kirby however, the epipleurae are recorded as " absent " or invisible. This condition is due to their complete inflexion (Pl. I, fig. 16). In a species from Algeria the epipleurae are partly visible. In the Subfamily Malachinae, in the genus *Malachius* they are inflexed, while in *Collops* they are visible from without.

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[6] Trans. Amer. Ent. Soc., LX, p. 262, pl. 16, figs. 7, 8, 1934.

In determining the character of the ungual appendages, it is necessary to examine a varying number of specimens of each species, in order to recognize the details of those that are well preserved; a large percent of the appendages in mounted and dried specimens are wrinkled, folded over or otherwise imperfect. Freshly collected specimens should be examined whenever possible.

The epipleurae present characters in the different genera that are recognized as taxonomic criteria and, it is likewise necessary to examine them in a definite manner. The epipleural surface should be viewed from all angles, especially at right angles to their own surface plane, as well as their relation to the transverse horizontal plane of the body when the elytra are in the state of normal repose, also their relation to the abdominal segments. It is very important to know if the surface plane is horizontal, more or less reflexed or inflexed; also the relation their margins have to each other and whether they are distinct, entire or more or less evanescent.

The author is indebted to The Academy of Natural Sciences of Philadelphia through Mr. E. T. Cresson, Jr., for the loan of material from the collection of the American Entomological Society, especially from that of Dr. George Horn; to Mr. H. C. Fall of Tyngsboro, Massachusetts, for the gift and loan of correctly identified species. The material in the collection of the California Academy of Sciences has been utilized.

List of Authors and dates of publication of the genera of the Tribe Dasytini: Gustav von Paykull, 1799, *Dasytes*. James F. Stephens, 1830, *Dolichosoma*. T. Victor von Motschulsky, 1859, *Byturosoma, Trichochrous, Emmenotarsus* and *Listrus*. John L. LeConte, 1861, *Eschatocrepis;* 1866, *Pristoscelis* and *Allonyx*. George H. Horn, 1882, *Mecomycter*. Henry S. Gorham, 1886, *Cymbolus* and *Holomallus*. Thomas L. Casey, 1895, *Dasytellus, Leptovectura, Vectura, Pseudallonyx, Dasytastes, Eudasytes,* *Adasytes Sydatopsis, Cradytes, Listromimus, Sydates,* and *Asydates.* George C. Champion, 1913, *Eucymbolus.* Henry C. Fall, 1930, *Vecturoides.* Frank E. Blaisdell, Sr., 1921, *Listrimorpha;* 1924, *Hoppingiana, Eutricholistra* and *Listropsis;* 1937, *Amphivectura, Trichochroides, Trichochronellus* and *Eutrichopleurus.*

The following genera are not at hand for verification of characters: *Cymbolus, Holomallus, Eucymbolus, Sydates, Sydatopsis* and *Listromimus.*

Generic Synopsis of the Dasytini

Last segment of the maxillary palpi strongly securiform; antennae serrate 1

Last segment of the maxillary palpi not securiform......................2

1. Form oblong, parallel, convex. Eyes strongly faceted; pronotum with smooth tumid spaces; epipleurae hollowed, polished and with crenulate external margins. Ungual appendages as long as the claws. Color not metallic. Guatemala......................1. *Cymbolus*

Form broad-ovate, metallic, strongly villous. Observed from above the sides of pronotum form an almost continuous line with the elytra. Eyes finely faceted; elytra with a very sharp submarginal carina, corresponding in length with the deeply excavate epipleurae, the latter very broad anteriorly and narrow posteriorly. Ungual appendages present......................................2. *Eucymbolus*

2. Elytral epipleurae more or less distinctly defined at least toward base 3

Elytral epipleurae completely inflexed and invisible from without; pronotum without a submarginal line; ungual appendages unequal. Body form unusually elongate and subcylindrical..........3. *Dolichosoma*

3. Head and mandibles of moderate size or smaller...................4

Head large, mandibles stout and longer in the male. Epistoma connate with the frontal apex; length of articulating membrane depends on degree of retraction or extension of the labrum ......4. *Pristoscelis*

4. Species with well developed submarginal pronotal excavated lines 5

Species without submarginal pronotal lines.........................14

5. Pronotum not constricted behind the apex; sometimes more or less feebly sinuate at sides behind the apical angles and the apical margin somewhat reflexed as in *Vectura*................................6

Pronotum more or less strongly constricted at sides and across the disk behind the apex. Ungual appendages well developed and as long as the claws, detached and free nearly throughout their length.
5. *Eschatocrepis*

6. Ungual appendages mutually equal or nearly so, variable in development...7

Ungual appendages extremely unequal, the inner long and attached to the claw nearly throughout its length, the outer rudimentary or altogether obsolete..........11

7. Ungual appendages fully as long as the claws..........8
Ungual appendages very short or rudimentary and attached to the claws nearly throughout their own length..........6. *Dasytes*

8. Species larger, length usually 2.4 to 4 mm..........9
Species very small, length usually about 1.75 mm..........7. *Dasytellus*

9. Legs black, protibiae without external spicules, tibial spurs absent...10
Legs entirely bright rufo-testaceous. Pubescence dense, cinereous and closely appressed to the surface. Apical pronotal margin noticeably slightly reflexed as in *Vectura*. Color of body black. Ungual appendages rounded and quite as long as the claws, attached nearly throughout the length of the latter. (Syn. *Menovectura* Blaisdell).
8. *Vecturoides*

10. Pubescence very short, decumbent, grayish to slightly flavate. Pronotal submarginal lines entire, with their lateral margins near the base curving outward to the basal angles causing the surface to appear obliquely subogival, the grooves curving inward. Pronotal surface not scabrous..........9. *Amphivectura* n. gen.
Pubescence nigro-fuscous, dual, short hairs slender and almost decumbent; longer black hairs nearly erect on the elytra and bristling on the prothorax and head. Pronotum densely and coarsely scabrous laterally, more or less finely so centrally, sometimes obscuring the excavated submarginal lines; Surface not ogival within the basal angles..........10. *Hoppingiana*

11. Epipleurae wide and horizontal..........12
Epipleurae narrow and sharply defined externally in basal one-half, thence gradually very feebly defined and subobsolete beyond middle of second ventral segment. Body listriform, narrow and subparallel. Ungual appendage of inner claws large and lamelliform, closely affixed throughout its length, the outer claws simply obtusely swollen or subdentate internally at base..........11. *Leptovectura*

12. Epipleurae not abruptly vanishing posteriorly; body cuneiform.....13
Epipleurae abruptly ending near the elytral apex, by the inner margin, though briefly feeble, joining the outer; body parallel....12. *Allonyx*

13. Epipleurae gradually narrowed and inflexed in plane toward apex, the inner margin not joining the outer..........13. *Pseudallonyx*
Epipleurae gradually narrowing posteriorly. Color more or less pale testaceous. Pronotal apex more or less feebly reflexed, sides sinuate before and less so behind the middle..........14. *Vectura*

14. Ungual appendages rudimentary or altogether obsolete..........15
Ungual appendages mutually equal or nearly so, as long as the claws or almost..........17

15. Appendages completely obsolete on both claws..........16
Appendages very short and rudimentary..........15. *Dasytastes*

16. Head more or less elongate. Claws with a small internal enlargement at base. Epipleurae moderate in width and subhorizontal, becoming extinct behind the middle.........................16. *Mecomycter*

Head not elongate. Facies of an *Asydates*. Claws slender and not enlarged at base. Antennae long in male, shorter in female. Epipleurae wide and horizontal, extinct near apex. Anterior tibiae with stout spinules externally..................17. *Pseudasydates* n. gen.

17. Anterior tibiae beset externally with stout spinules.................18

Anterior tibiae devoid of spinules, or with the latter few in number and very slender..29

18. Epipleurae broad and horizontal, more or less inflexed in plane toward apex...19

Epipleurae narrow, wider toward base, more or less strongly reflexed in plane...20

19. Apical pronotal angles anteriorly prominent; color black, legs pale or black...18. *Eudasytes*

Apical angles not prominent anteriorly; elytra and abdomen more or less pale rufous.......................................19. *Asydates*

20. Antennae short and not pilose...................................21

Antennae long, strongly serrate and clothed with long sparse and flexible hairs......................................20. *Sydatopsis*

21. Side margins of the pronotum not serrate..........................22

Side margins more or less serrate, especially anteriorly....21. *Cradytes*

22. Ungual appendages as long as the claws; pronotal punctures moderate to small in size...23

Ungual appendages about two-thirds as long as the claws; pronotal punctures moderately large and well separated.....22. *Eutricholistra*

23. Anterior tibiae straight, not conspicuously spiculate internally; anterior coxae moderate in size and not flattened on their outer face; base of pronotum not lobed...................................24

Anterior tibiae longer than usual, more or less arcuate and bent outward at apex, inner surface distinctly spiculate; anterior femora flattened on their inner surface, slightly concave and adapted to the outer face of the coxae when in repose..............23. *Byturosoma*

24. Body clothed with one kind of pubescence only..................25

Body clothed with dual pubescence, recumbent and erect hairs......26

25. Body clothed with more or less closely recumbent pubescence, without trace of intermixed erect hairs or setae; marginal pronotal fringe short and regular...............................24. *Trichochrous*

Body clothed with moderately long suberect blackish pubescence; marginal pronotal fringe composed of rather short, even and stiff black hairs............................25. *Trichochronellus* n. gen.

26. Form oblong-oval, parallel. Ungual appendages as long as the claws 27

Form oblong-ovate, densely pubescent, hairs long, of varying lengths, not all erect, shaggy; ungual appendages slender, minute and not connate (Mexico).................................26. *Holomallus*

27. Body clothed with short cinereous or blackish subdecumbent pubescence, intermixed abundantly with long hispid hairs, black or cinereous in color; pronotal fringe long, erect, bristling and not regular and close-set..28

Body clothed with dense subdecumbent and cinereous pubescence, intermixed at least toward sides of elytra with short, sparse and erect cinereous setae which frequently seem to be serial in arrangement; pronotal fringe short, even and close-set...27. *Eutrichopleurus* n. gen.

28. Species with the fifth ventral abdominal segment of the male, truncate or sinuato-truncate at apex and not modified on the disk. 28. *Emmenotarsus*

Species with the fifth ventral sinuate at apex and modified on the disk in the male..............................29. *Trichochroides* n. gen.

29. Ungual appendages generally fully as long as the claws; tibiae without spinules, except occasionally and inconspicuously in *Listrus*.......30

Ungual appendages slightly abbreviated and unequal, acutely pointed. Antennae long and strongly serrate. Tibiae with few slender setiform spinules. Body form rather stout and oblong with ornamentation remindful of *Listrus*..............................30. *Sydates*

30. Prothorax not at all constricted anteriorly.........................31

Prothorax broadly constricted near apex.............31. *Listromimus*

31. Pronotal disk not impressed within the basal angles...............32

Pronotal disk broadly and feebly impressed within the basal angles; ungual appendages slightly longer than the claws. Last segment of of the maxillary palpi conical.....................32. *Listrimorpha*

32. Pronotum more or less dilated posteriorly.........................33

Pronotum not dilated nor serrulate at the sides toward base. 33. *Adasytes*

33. Lateral margin of the pronotum minutely serrulate and with a well developed even fringe. Anterior tibiae occasionally with a few spinules. Elytral vestiture uniform in color or variegated. 34. *Listrus*

Lateral margin not serrulate. Body listriform with the pubescence dual and sparse, not variegated. Anterior tibiae devoid of spinules. 35. *Listropsis*

GENERIC CHARACTERIZATIONS

I. CYMBOLUS Gorham

Biol. Centr.-Amer., Coleopt., III, (2), p. 324, (April), 1886.

GENOTYPE: *Cymbolus rufopiceus* Gorham, 1886. Biol. Centr.-Amer., Col., III, (2), p. 324. (Present designation.)

Genotype locality: San Geronimo, Guatemala, (Champion).

Form oblong, parallel, from above convex. Eyes strongly faceted. Antennae as long as head and pronotum, not incrassate; last segment of maxillary palpi strongly securiform; pronotum with smooth tumid spaces and with the lateral wide portion finely rugulose, margin finely crenulate. Epipleurae hollowed, polished and with crenulate external margins. Ungual appendages membranous and as long as the claws.

Gorham states that the genus *Cymbolus* is not very near to any other known to him. By the ungual appendages and the basal segment of the tarsi as long as or a little longer than the second it falls into the Dasytini. He states also that by its somewhat bulky build, it reminds one of a large *Cis*. The genus is related to *Arthrobrachys* Solier and belongs to the section Dasytinae (Champion). Unknown to the author.

2. EUCYMBOLUS Champion

Trans. Ent. Soc. London, p. 129, (June), 1913.

GENOTYPE: *Eucymbolus cyaneus* Champion, 1913. Trans. Ent. Soc. London, 1913, p. 130. (By monotypy.)

Genotype locality: Sinanja in Alta Vera Paz, Guatemala.

Form broad-ovate, from above convex, metallic, strongly villose. Eyes transverse, sinuato-emarginate in front, finely faceted. Elytra with a very sharp submarginal carina, corresponding in length with the deeply excavate epipleurae, the latter very broad anteriorly and narrow behind, about reaching the second ventral suture. Ungual appendages present, not described by Champion.

It resembles *Cymbolus* Gorham, in its serrate antennae, securiform apical segment of the labial and maxillary palpi, as well as in the coarsely punctured villous surface. It differs from it in body form, less coarsely faceted eyes and more sharply carinate sides of the elytra; observed from above the sides of the prothorax form an almost continuous outline with those of the elytra. Unknown to the Author.

3. DOLICHOSOMA Stephens

Illus. Brit. Ent., Mand., III, p. 318, 1830.

GENOTYPE: *Dasytes linearis* Paykull, 1880. Fauna Suec., *III*, p. 454 [=*Dolichosoma linearis* (Paykull)]. (Present designation.)

Genotype locality: Sweden.[7]

Body extremely elongate and subcylindrical, differing very much in facies from any other of the tribe. Head short before the eyes, the latter oval and prominent; epistoma connate with the front, labrum relatively large, articulating membrane smooth, dark and subcoriaceous. Epipleurae not visible, completely inflexed (Pl. I, fig. 16), wide and subparallel, obsolete opposite the metasternum, evanescent some distance from apex. Pronotum without submarginal excavated lines. Tibiae devoid of external spinules, but clothed sparsely throughout with long more or less erect, stiff black hairs; tarsi pubescent beneath (Pl. II, fig. 22). Antennae (Pl. II, fig. 27) long, compressed, not incrassate toward apex, segments longer than wide.

Tarsal claws (Pl. II, fig. 20) stout and strongly developed; the inner having a large corneous internal dilatation in basal one-half, which is continued to the apex by the rounded membranous appendage, the latter leaving a small part of the tip of the claw free; outer claw has the inner corneous dilatation extending far beyond the middle, but the appendage forms merely a membranous terminal margin, the apical portion of the claw is more prolonged and arcuate than the corresponding part of the inner claw.

4. PRISTOSCELIS LeConte

Proc. Acad. Nat. Sci., Phila., XVIII, p. 350, 1866.

GENOTYPE: *Pristoscelis grandiceps* LeConte, 1866. Proc. Acad. Nat. Sci., Phila., XVIII, p. 355. (By monotypy.)

Genotype locality: Middle California (LeConte).

Form different in the sexes. In the male the head is large (Pl. I, fig. 1), not prolonged before the eyes, the latter large, prominent, distant from the base, finely setose; mandibles stout and prognathic. Epistoma connate with the frontal apex, sutures obsolete; articulating membrane smooth, brownish to pale in color, in full retraction of the labrum disappears to appear as a bead at apex of the epistoma. Labrum relatively small (Pl. I, fig. 2). Epipleurae (Pl. I, fig. 13) moderately wide at base, gradually narrowing to vanish at beginning of the apical curve, their surface distinctly reflexed. Ungual appendages (Pl. II, fig. 2) moderately large, long as the claws and subequal; the inner detached from claw for about one-third of its length.

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[7] The typical American species of the genus, (Casey), is *Dasytes foveicollis* Kirby. Fauna Boreal-Amer., pt. 4, Ins., p. 243, 1837. LeConte, Proc. Acad. Nat. Sci., Phila., XVIII, p. 358, 1866 (*Dolichosoma*).

5. **ESCHATOCREPIS** LeConte

Smithson. Miscel. Coll., III, p. 193, 1861.

GENOTYPE: *Dasytes constrictus* LeConte, 1852. Proc. Acad. Nat. Sci. Phila., VI, p. 170 [=*Eschatocrepis constrictus* (LeConte)]. (By monotypy.)

Genotype locality: San Diego, California.

Form elongate. Pubescence short, appressed, more or less cinereous, without longer erect hairs. Antennae rather short (Pl. II, fig. 31), not serrate; either gradually incrassate or with a somewhat abrupt three-segmented club. Pronotum with a transverse subapical constriction (Pl. I, fig. 26), disk with deep impressed submarginal lines. Eyes large and basal. Epipleurae narrow and horizontal, with the surface plane gradually turned upward and inward posteriorly. Anterior tibiae cylindrical and devoid of all trace of spinules. Ungual appendages (Pl. II, fig. 3) equal, rather slender, well developed and as long as the claws, but are clearly detached from them except near the base.

6. **DASYTES** Paykull

Fauna Suec. II, p. 156, 1799.

GENOTYPE: *Lagria nigra* Fabricius, 1792. Ent. Syst., I, (2), p. 80 [=*Dasytes nigra* (Fabricius)]. (Present designation.)

Genotype locality: San Francisco, California (Motschulsky).

Pronotal disk with submarginal depressed lines delimiting a lateral roughly sculptured area. Pubescence recumbent, with erect hairs intermixed or not. Epipleurae moderately wide at extreme base, with their surface plane reflexed, thence gradually and rapidly assuming the form of a mere line opposite the first two abdominal segments, thus disappearing completely far in front of the apex. Anterior tibiae slender, devoid of spinules externally. Ungual appendages (Pl. II, fig. 4) equal, but very short or rudimentary. Epistoma connate with the frontal apex, articulating membrane smooth, brownish basally, whitish apically, evidently capable of disappearance on retraction of the labrum.

7. **DASYTELLUS** Casey

Ann. N. Y. Acad. Sci., VIII, p. 459, 564, 1895. (Coleopt. Notices, VI.)

GENOTYPE: *Pristoscelis nigricornis* Bland, 1864. Proc. Ent. Soc. Phila., 1864, p. 254 [=*Dasytellus nigricornis* (Bland)]. (Present designation.)

Genotype locality: Kansas, (Bland).

Form very small, smallest of the tribe. Pronotal disk with impressed submarginal lines. Antennae as a rule much shorter and more incrassate toward tip than in *Dasytes*. Marginal cilia of the body invisible under low power; no erect hairs, pubescent decumbent. Epipleurae very narrow, widest opposite to the sterna, gradually becoming subvertical and evanescent behind as in *Dasytes*. Anterior tibiae slender and completely devoid of spinules. Ungual appendages (Pl. II, fig. 5) well developed and generally fully as long as the claws.

It is singular that Dr. LeConte should have associated this species with *Dolichosoma foveicollis* Kirby, as Col. Casey remarked—there is absolutely no single point of resemblance.

8. **VECTUROIDES** Fall

Can. Ent., LXII, p. 255, (Nov.), 1930.

GENOTYPE: *Vecturoides pseudonycha* Fall,[8] 1930. Can. Ent., LXII, p. 256, ♀. (By monotypy.)

Genotype locality: Mt. Wilson, Los Angeles County, California.

Form moderately elongate, subdepressed, gradually widened posteriorly; body black, legs entirely bright rufo-testaceous. Pubescence dense, hairs coarse, appressed and cinereous in color; body beneath albido-pubescent. Antennae short (Pl. II, fig. 28). Pronotal apex (Pl. I, fig. 17) slightly reflexed; sides rounded, feebly prominent at middle, thence convergent and slightly sinuate behind the apex, less so posteriorly, margin finely serrulate; base broadly lobed; submarginal excavated lines not entire. Ungual apendages (Pl. II, fig. 7 and fig. 17) rounded, nearly or quite as long as the claws and attached throughout (Fall). Epipleurae (Pl. I, fig. 12). Anterior tibiae without spicules externally. General facies of *Vectura*.

9. **AMPHIVECTURA** new genus

GENOTYPE: *Hoppingiana monticola* Blaisdell, 1934. Can. Ent., LXVI, p. 150 [=*Amphivectura monticola* (Blaisdell)].

Genotype locality: Copper Mountain, British Columbia, elev. 4300 feet.

Form moderately elongate, oblong-subovate. Pubescent, hairs short, pale, recumbent throughout, not dense; erect hairs or setae absent. Epistoma connate with the frontal apex, position of suture more or less indicated by a linear transverse raised line. Articulating membrane smooth and more or less pale. Antennae short (Pl. II, fig. 29), as long as the pronotum. Pronotal submarginal excavated lines strong and entire, curving inward before the base to the position of the obsolete submarginal groove, their lateral margin curving outward to the subacute basal angles, causing the surface within the angles to appear obliquely subogival.

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[8] Correctly identified specimens of *pseudonycha* have been received from H. C. Fall. I cannot consider the genus *Menovectura* Blaisdell distinct from *Vecturoides* Fall. The species *Vecturoides* (nec *Menovectura*) *serrulata* Blaisdell is valid; the types are from Caliente, Kern County, California.

Epipleurae moderately wide and horizontal opposite the sterna, gradually reflexed beyond to the first abdominal segment and thence rapidly narrowing to become evanescent opposite the apex of third ventral segment; their inner margins distinct and entire; lateral margins evanescent beyond the sterna. Legs short; anterior tibiae without spinules externally. Ungual appendages oblong, subacute, mutually equal and when well preserved as long as the claws and attached nearly to the apex.

10. HOPPINGIANA Blaisdell

Can. Ent., LVI, p. 2, (Jan.), 1924.

GENOTYPE: *Hoppingiana brevilabris* Blaisdell, 1924. Can. Ent., LVI, p. 3 [=*Dasytes hudsonicus* LeConte, 1866. Proc. Acad. Nat. Sci. Phila., 1866, p. 360 =*Hoppingiana hudsonicus* (LeConte)]. (Original designation.)

Genotype locality: Hudson Bay Territory. (LeConte).

Head very short (Pl. I, fig. 4) before the eyes, the latter moderately prominent and distinctly setose. Epistoma connate with the frontal apex, its base marked by a slight difference in the surface plane. Articulating membrane short, pale or dark and subcoriaceous, surface smooth. Labrum transverse. Epipleurae rather feebly defined in basal one-third, its external margin obsolete in apical two-thirds, the surface plane continuous with that of the declivous sides of the elytra. Tibiae without stout spinules, clothed with slender spiculiform hairs. terminal spurs absent. Ungual appendages (Pl. II, fig. 6) distinctly shorter than the claws and free at apex.

Recent studies have revealed that *Dasytes hudsonicus* LeConte has, heretofore, been wrongly identified. It is very certain that *Hoppingiana brevilabris* Blaisdell is that species, but it is not a *Dasytes*. In 1928, W. J. Brown described another supposedly new species, namely *kingi*, which has since proved to be the male of *brevilabris*, the type being a female. The solution of the problem came about as follows:

Mr. Ralph Hopping of Vernon, British Columbia, in a letter states that he loaned H. C. Fall his specimen of *Dasytes hudsonicus,* which was determined by me. Mr. Fall responded by stating that he had compared the specimen with the type of *hudsonicus,* and that Hopping's species was not that species at all. A specimen of Hopping's *hudsonicus* of Fall's from the same locality he once submitted to Col. Casey, who pronounced it *Dasytes obtusus,* but Mr. Fall did not think it was that species; but he does think that *Hoppingiana brevilabris* Blaisdell is the true *hudsonicus* of LeConte, remarking that when compared with the type they could not be told apart.

With Mr. Hopping's permission I will quote from Fall's letter: " The true *D. hudsonicus* as I have written you previously is so close to H. *brevilabris* and to *kingi* Brown that I do not see how these three species can be kept apart. This opinion is based on a careful comparison of the type of *hudsonicus* with paratypes of *brevilabris* and *kingi.* It is certain that they are congeneric. Mr. Brown also remarked on the similarity to *D. hudsonicus* when he described *H. kingi.*" As *hudsonicus* possesses characters discordant with those of *Dasytes,* the genus *Hoppingiana* is accepted as valid.

II. LEPTOVECTURA Casey

Ann. N. Y. Acad. Sci., VIII, p. 594, 1895. (Coleopt. Notices, VI.)

GENOTYPE: *Leptovectura adspersa* Casey, 1895. Ann. N. Y. Acad. Sci., VIII, p. 595. (By monotypy.)

Genotype locality: New Mexico, (Casey).

Body listriform. Epistoma connate with the frontal apex without sutures, brownish at apex. Articulating membrane pale and smooth, without punctures or hairs. Epipleurae (Pl. I, fig. 10) moderately wide at base opposite the sterna and first abdominal segment, sharply defined externally in basal one-half; thence gradually disappearing posteriorly in a fine line on the external flanks very near the edge as in *Dasytes.* Ungual appendage (Pl. II, fig. 8) of the inner claw very large and lamelliform, apparently closely affixed throughout its length; the outer claw is simply obtusely swollen or subdentate internally at base. Pubescence dense, hairs rather long and broad, appressed closely, white and brown confusedly intermingled.

12. ALLONYX LeConte

Proc. Acad. Nat. Sci., Phila., xviii, p. 359, 1866.

Genotype: *Dasytes sculptilis* LeConte, 1859. Proc. Acad. Nat. Sci. Phila., xi, p. 75 [=*Allonyx sculptilis* (LeConte)]. (Present designation.)

Genotype locality: Fort Tejon, California, (LeConte).

Body form parallel. Vestiture very feebly developed. Antennae (Pl. I, fig. 19) rather short, feebly incrassate and scarcely at all serrate (Pl. I, fig. 19). Maxillae pale in color, palpi somewhat short. Epistoma connate with the frontal apex, articulating membrane smooth and without punctures or hairs. Pronotum transverse and parallel, submarginal excavated lines strong, variable in length, parallel to and some distance from the lateral margin, the intervening surface broadly explanate, and only a little more strongly sculptured than the median parts of the disk. Epipleurae (Pl. I, fig. 8) wide, flat and subhorizontal throughout, preserving their width almost unaltered to within a short distance of the apex and there terminating quite abruptly, with the inner margins briefly feeble and joining the outer margins. Ungual appendages (Pl. II, fig. 9) asymmetrical; outer claw slender, with a feeble dentiform dilatation and small appendage; inner claw with a broad, obtusely rounded appendage, attached almost to or obscuring tip of the claw. Anterior tibiae without spinules externally.

13. PSEUDALLONYX Casey

Ann. N. Y. Acad. Sci., viii, p. 593, 1895. (Coleopt. Notices, VI.)

Genotype: *Allonyx plumbeus* LeConte, 1866. Proc. Acad. Nat. Sci. Phila., xviii, p. 359 [=*Pseudallonyx plumbeus* (LeConte)]. (By monotypy.)

Genotype locality: Colorado, (LeConte).

Body cuneiform. Pubescence appressed, not very coarse, rather long, white and somewhat dense on the elytra. Eyes large and basal, minutely setose. Antennae somewhat short, feebly incrassate and scarcely at all serrate. Epistoma connate with the frontal apex, articulating membrane smooth as usual; labrum small. Pronotum widest just behind the middle, sides distinctly convergent anteriorly and straight or slightly sinuate posteriorly; apex narrower than the base, the latter broadly arcuate and obliquely sinuate laterally, angles obtuse; submarginal excavated lines not attaining the apex. Epipleurae wide, flat, punctate and horizontal, gradually inflexed in plane toward apex, inner margin ending abruptly and at greater distance from apex, not joining the external margin. Ungual appendages (Pl. II, fig. 10) asymmetrical, the inner claws somewhat smaller than the outer and more abruptly bent at apex, its appendage larger and thicker, closely adherent almost throughout its length; the appendage of the outer claw is small and altogether basal. Anterior tibiae without stout spinules externally.

Pseudallonyx has a facies more like that of *Vecturoides* than *Allonyx* where the form of the body is parallel; it differs also from *Allonyx* in epipleural characters.

14. VECTURA Casey

Ann. N. Y. Acad. Sci., VIII, p. 591, 1895, (Coleopt. Notices, VI).

GENOTYPE: *Vectura longiceps* Casey, 1895. Ann. N. Y. Acad. Sci., VIII, p. 593. (Present designation.)

Genotype locality: Yuma, Arizona, (Casey).

Body cuneiform, color more or less pale testaceous. Head (Pl. I, fig. 3) small and more elongate than usual. Antennae (Pl. II, fig. 30) moderate in length, scarcely serrate and feebly incrassate apically. Eyes situated before the base of the head. Pronotal submarginal lines (Pl. I, fig. 18) do not attain the apex; sides convergent, apex narrower than base, more or less strongly sinuate behind the apex; basal angles acute and prominent. Epipleurae wide, flat, subhorizontal and pubescent, becoming gradually narrow behind the middle and inflexed apically. Tibiae devoid of spinules. Ungual appendages (Pl. II, fig. 11) asymmetrical, inner claw has a very long and rather thick corneous expansion and, the membranous appendage is correspondingly thickened, but extends to the tip of the claw; the outer claw has the appendage obsolete.

15. DASYTASTES Casey

Ann. N. Y. Acad. Sci., VIII, p. 582, 1895. (Coleopt. Notices, VI.)

GENOTYPE: *Dasytes catalina* LeConte, 1866. Proc. Acad. Nat. Sci. Phila., XVIII, p. 361 [=*Dasytastes catalina* (LeConte)]. (Present designation.)

Genotype locality: Santa Catalina Island, California.

Form small, in general appearance resembling a *Dasytes*. Antennae shorter and much more definitely incrassate toward apex as a rule, than in *Dasytes*. Epipleurae widest opposite the sterna, thence narrow and evanescent, outwardly reflexed, with the external margin feeble to obsolete. Pronotal disk simply punctate and devoid of submarginal lines and lateral rugose areas. Ungual appendages minute and rudimentary. Metatarsi slender (Pl. II, fig. 21).

16. MECOMYCTER Horn

Trans. Amer. Ent. Soc., x, p. 125, 1882.

GENOTYPE: *Mecomycter omalinus* Horn, 1882. Trans. Amer. Ent. Soc., x, p. 126. (By subsequent designation of Champion, 1914. Trans. Ent. Soc., London, p. 124.)

Genotype locality: Western Kansas, (Horn).

Head elongate (Pl. I, fig. 24). Ungual appendages completely obsolete, the claws being at the same time unusually slender and with a small internal enlargement at base. Submarginal impressed lines completely absent from the pronotal disk. Epipleurae subhorizontal and moderate in width opposite the sterna, thence rapidly becoming obsolete behind the middle. The genus further differs from the members of the *Allonyx* group, which it resembles to some extent (Casey), in having all of the tibiae beset externally with a few blackish spinules.

17. PSEUDASYDATES new genus

GENOTYPE: *Pseudasydates inyoensis* new species.

Genotype locality: Silver Canyon, White Mts., Inyo County, California.

Facies and certain characters of a rather large *Asydates*. Color nigroferruginous, elytra and abdomen more or less rufo-testaceous, especially in the female. Pubescence dual, rather sparse, more or less recumbent, hairs pale; erect black hairs on head and pronotum, on elytra in basal one-third, thence more or less replaced by pale erect hairs. Head moderate in size. Antennae noticeably compressed, long in the male, shorter in the female; slightly incrassate and subserrate, all segments except second, third and eleventh, constricted at base. Pronotum devoid of submarginal impressed lines, coarsely and discretely punctate. Epipleurae wide and horizontal, gradually narrowing beyond the second abdominal segment, becoming evanescent opposite the fifth segment, both margins distinct and entire. Anterior tibiae with few stout black spinules externally. Ungual appendages absent. Tarsal segments somewhat thickened at apex beneath or very slightly lobed. Claws not thickened at base.

Pseudasydates inyoensis new species

Facies of a large *Asydates,* about two and one-half times as long as wide. Color nigro-ferruginous, elytra gradually paler toward apex; head, prothorax and sterna nigropiceous; abdomen and legs paler ferruginous, antennae similarly pale to piceous. Pubescence not dense, more or less recumbent and pale, with paler erect hairs on the elytra, erect black, stiff hairs on the head and prothorax and few about the elytral base.

Head twice as wide as long before the post-ocular line, widest across the eyes and there quite as wide as the pronotal apex; frons slightly convex, feebly swollen behind the connate epistoma; articulating membrane smooth, pale to black, labrum somewhat semicircular at apex; surface smooth and shining very coarsely and discretely punctate. Eyes large and moderately prominent. Antennae noticeably compressed beyond the third segment, in length different in the sexes, slightly incrassate; segments four to ten inclusive obtusely prominent anteriorly or subserrate, all segments, except second, three to ten inclusive constricted in about basal fourth, seven to ten less noticeably so; second stout, third obconical and about twice as long as wide, slightly swollen at apex anteriorly; fourth, fifth and sixth slightly longer than seven to ten inclusive; eleventh subfusiform-oval and as long as the ninth and tenth taken together.

Pronotum a little wider than long, sides noticeably convergent before basal third; apex truncate in moderate circular arc, angles moderately broadly rounded; sides with the base semicircularly arcuate; disk strongly convex from side to side, almost continuously so with the flanks except for a feeble marginal bead, surface smooth and shining, coarsely punctate, punctures separated by a distance equal to one or two times their diameter. Elytra about one-half longer than wide and less than three times as long as the pronotum; somewhat depressed in basal two-thirds, arcuately declivous laterally and very gradually, subexplanately declivous apically; sides rather abruptly declivous and appearing broadly sinuate when viewed longitudinally behind the well rounded and somewhat prominent humeri; the submarginal area rather narrowly explanate and feebly concave, becoming lost in the general surface apically. Surface rather coarsely and somewhat densely punctate.

Abdomen less than moderately convex. Metatibiae as long as the metafemora; metatarsi as long as the metatibiae. Tarsi moderately slender, first four segments of each very briefly lobed or swollen at their apicès beneath; first segment a little longer than the second, the latter and third quite equal in length and together as long as the fifth. Tibial spurs moderately short and subequal; claws without membranous appendages.

Male. Somewhat more parallel. Antennae a little stouter and longer, extending beyond the pronotal base; segments five to eleven more bristling with pale hairs anteriorly. Fifth ventral abdominal segment subtruncate at apex, surface at middle somewhat feebly impressed within the margin.

Female. Somewhat broader and feebly subovate. Antennae less stout, extending nearly to the pronotal base and less bristling with pale hairs. Fifth ventral a little longer and moderately arcuate at apex.

Measurements.—(Types) Length, 3.5 to 4 mm.; width, 1.75 to 2 mm.

Holotype.—Male; Silver Canyon, White Mountains, Inyo County, California. Collected by J. O. Martin of Berkeley, California, on May 10, 1936. [No. 4473, and *allotype*, female, No. 4474, collection of the California Academy of Sciences.]

Paratypes.—Thirty specimens have been studied and designated as paratypes. Mr. Martin has permitted eight specimens to be deposited in the collection of The American Entomological Society.

Mr. Martin secured specimens at Payson, White Mts., Inyo County; Mr. H. Hulgren has collected the species in Mosaic Canyon, Death Valley, Inyo County, April 6, 1936, and reports that the species occurs on *Eucnide urens* Parry, a plant belonging to the Blazing Star Family (Loasaceae).

18. **EUDASYTES** Casey

Ann. N. Y. Acad. Sci., VIII, p. 460, 1895. (Coleopt. Notices, VI.)

GENOTYPE: *Eudasytes amplus* Casey, 1895. Ann. N. Y. Acad. Sci., VIII, p. 461. (Present designation.)

Genotype locality: California, (Casey).

Form oblong. Antennae more or less stout as well as serrate. Eyes large and minutely setose. Epistoma connate with the frontal apex. Articulating membrane smooth as usual. Pronotal apical angles anteriorly prominent. Epipleurae (Pl. I, fig. 14) wide, flat and horizontal to within a short distance of the apex, the margins uniting and equally distinct; lateral margins of the elytra narrowly reflexed and entire. Tibial spurs small and distinct, the external of the anterior and middle tibiae modified. Procoxae moderately large and transverse. Ungual appendages (Pl. II, fig. 12) about or nearly as long as the claws. This genus is most closely related to *Byturosoma* Motschulsky.

19. **ASYDATES** Casey

Ann. N. Y. Acad. Sci., VIII, p. 460, 1895. (Coleopt. Notices, VI.)

GENOTYPE: *Asydates rufiventris* Casey, 1895. Ann. N. Y. Acad. Sci., VIII, p. 464. (Present designation.)

Genotype locality: Santa Barbara, California, (Casey).

Form oblong to suboval. Color nigro-piceous more or less varied with rufous. Prothorax small. Elytra broad and subdepressed, narrowly reflexed at the sides. Epipleurae broad and flat, becoming abruptly obsolete at some distance from the apex. Anterior tibiae with stout spinules externally. Ungual appendages (Pl. II, fig. 13) well developed, rather acute at apex and nearly as long as the claws. The epistoma is connate with the frontal apex, but not defined, apparently coriaceous in part and pale at apex, its surface has few scattered punctures and hairs; articulating membrance smooth and fully exposed when the labrum is extended, when the latter is completely retracted there appears a fine hair-like bead at the epistomal apex.

20. SYDATOPSIS Casey

Ann. N. Y. Acad. Sci., VIII, p. 536, 1895. (Coleopt. Notices, VI.)

GENOTYPE: *Sydatopsis longicornis* Casey, 1895. Ann. N. Y. Acad. Sci., VII, p. 536. (By monotypy.)

Genotype locality: Lower California, (Casey).

Form oblong and strongly convex. Antennae of the male distinctly longer than the head and prothorax combined, rather narrow, not incrassate; segments strongly serriform, longer than wide, strongly narrowed toward base and clothed sparsely with long pale hairs; eleventh segment narrower than the tenth, elongate and pointed toward base and apex from the middle; fifth segment very slightly dilated. Anterior tibiae with stout spinules externally. Ungual appendages long and well developed. Color polished black; antennae and legs testaceous and rufoferruginous. Described from a single male specimen.

21. CRADYTES Casey

Ann. N. Y. Acad. Sci., VIII, p. 533, 1895. (Coleopt. Notices, VI.)

GENOTYPE: *Pristoscelis serricollis* LeConte, 1866. Proc. Acad. Nat. Sci. Phila., XVIII, p. 356 [=*Cradytes serricollis* LeConte)]. (Present designation.)

Genotype locality: New Mexico, (LeConte).

Epistoma corneous and connate with the frontal apex, articulating membrane smooth and without punctures or hairs. Eyes large, rounded and prominent. Antennae (Pl. II, fig. 25) relatively short, broader, with segments more or less serrate or asymmetrical. Pronotal apical angles rounded and obsolete, the median parts of the apex more or less narrowed and advanced giving a distinctly peculiar facies; lateral margins serrate, most strongly so before the middle, less so in the female. Epipleurae (Pl. I, fig. 11) widest at extreme base and there rather sinuately narrowed, thence narrow to become evanescent at considerable distance from the apex, surface plane somewhat reflexed. Anterior coxae transverse, not prominent, trochanters not strongly constricted at junction with the coxae. Anterior and middle tibial spurs distinct, short and curved. External claws rather more arcuate than the inner. Ungual appendages (Pl. II, fig. 14) about as long as the claws, the external more rounded at apex, all attached in about basal one-half.

22. EUTRICHOLISTRA Blaisdell

Pan-Pacific Ent., I, p. 17, (July), 1924.

GENOTYPE: *Eutricholistra punctata* Blaisdell, 1924. Pan-Pacific Ent., I, p. 17. (By monotypy.)
Genotype locality: Nogales, Arizona, (Blaisdell).

Head and pronotum very coarsely punctate, punctures separated by a distance equal to twice their diameters. Eyes nearly rounded, scarcely sinuate anteriorly and finely setose. Epistoma connate with the frontal apex, articulating membrane defined abruptly by its pale color from the epistomal apex, smooth and shining, without punctures or hairs. Labrum relatively large and arcuate at apex. Antennae short, somewhat stout, not pilose or strongly serrate. Lateral pronotal margins not serrulate and with a regular fringe. Epipleurae moderately wide opposite the sterna and horizontal, thence gradually narrowing, more or less reflexed, becoming evanescent opposite the fifth ventral abdominal segment. Procoxae subconical, rather short and stout. Anterior and middle tibiae rather short, the posterior slender; the anterior with stout spinules externally; tibial spurs distinct, those of the anterior and middle tibiae stouter and curved. Ungual appendages (Pl. II, fig. 15) about two-thirds as long as the claws, subequal and attached nearly their entire length.

23. BYTUROSOMA Motschulsky

Bull. Imp. Soc. Moscou, XXXII, (2), p. 395, 1859. (Col. Nouv. Californie.)

GENOTYPE: *Dasytes griseus* Motschulsky, 1859. Bull. Imp. Soc. Moscou, XXXII, (2), p. 359, (not LeConte, 1852) [=*Dasytes fuscus* LeConte, 1852. Proc. Acad. Nat. Sci. Phila., VI, p. 169 =*Byturosoma fuscus* (LeConte)]. (Present designation.)
Genotype locality: Vallecitas, San Diego County, California.

Form oblong-oval, robust, differing in the sexes. Head less shortened before the eyes, the latter large and not setose. Antennae (Pl. II, fig. 26) moderately stout and subserrate. Epistoma apparently well developed, defined at base by an angulate fine and raised line, its surface more or less smooth, sparsely punctate and with scattered hairs; its surface plane appears to be slightly obliquely downward. Labrum slightly wider than long, apex arcuate; articulating membrane smooth. Pronotum larger in the male, its lateral fringe loose and not close-set. Epipleurae wide at base, gradually narrowing to become evanescent a short distance from apex. Procoxae large and transverse, their outer surface concave in apical one-half; profemora (Pl. I, fig. 7) have the inner surface broadly flattened and slightly concave except at apical fourth; trochanters briefly subcylindrical. Protibiae somewhat stout, more or less distinctly arcuate and bent outward from near the apex, inner surfaces spiculate; spurs with those of the mesotibiae thickened and curved. Ungual appendages (Pl. II, fig. 16) large, broad and attached, the outer one free for a short distance.

24. TRICHOCHROUS Motschulsky

Bull. Imp. Sec. Moscou, xxxii, (2), p. 392, 1859. (Col. Nouv. Californie.)

Genotype: *Trichochrous cylindricus* Motschulsky, 1859. Bull. Imp. Soc. Moscou, xxxii; (2), p. 393. (Present designation.)

Genotype locality: Near San Francisco, California.

Form elongate or elongate oval. Pubescence abundant, subdecumbent or decumbent, without trace of intermixed erect setae. Prothorax similar in the sexes, with the lateral fringe short (generally), pale in color and more or less close-set. Antennae slender, more or less incrassate in the distal segments. Epistoma chitinous and connate with the frontal apex. Labrum rather small (Pl. II, fig. 24), quite semicircularly rounded at apex; articulating membrane rather short and smooth. Eyes large and moderately prominent. Epipleurae moderately narrow at base, margins not sinuate, thence gradually narrowing to become evanescent a short distance from the apex, surface plane reflexed. Anterior coxae comparatively small, subconical and moderately prominent. Protibiae (Pl. I, fig. 15) straight and not modified. Tibial spurs distinct, those of the anterior and middle tibiae modified. Ungual appendages (Pl. II, fig. 18) well developed, equal, quite as long as their claws and attached to them, except at outer third or fourth.

The synoptic characters separate *Trichochrous* from the other allied genera. In the present treatment, this genus as presented by Col. Casey, is subdivided into several genera, based on the groups of older authors and those of Casey, as can be seen in the synoptic table.

25. TRICHOCHRONELLUS new genus

Genotype: *Trichochrous stricticollis* Casey, 1895. Ann. N. Y. Acad. Sci., viii, p. 532 [=Trichochronellus stricticollis (Casey)].

Genotype locality: California, (Casey).

Body clothed with moderately long suberect blackish pubescence, and the marginal fringe of the pronotum composed of rather short, even and stiff black hairs. Prothorax sinuate at the sides behind the apex. Epistoma connate as usual. Labrum blackish, apex pale and strongly rounded; articulating membrane more or less pale. Eyes rather large and prominent. Antennae slightly longer than the prothorax and feebly incrassate.

26. HOLOMALLUS Gorham

Biol. Centr.-Amer., Coleopt., III, p. 325, (April), 1886.

GENOTYPE: *Holomallus aurivillus* Gorham, 1866, Biol. Centr.-Amer., III, p. 325, 1866. ♂. (By subsequent designation of Champion, 1914. Trans. Ent. Soc., Lond., p. 88, 1914.)
Genotype locality: Puebla, Mexico, (Salle).

Form oblong-ovate, viewed from above convex, densely pubescent, hairs long, of varying lengths, not all erect, shaggy. Antennae short, last five segments transverse, forming an elongate club. Pronotum transverse, convex, apex truncate (straight), angles rounded. Tarsi moderately long; ungual appendages slender, minute and not connate.

Champion states that *Holomallus* is closely related to *Trichochrous* (*sensu* Casey), but differs from it in the less prominent humeri and the oblong-ovate general shape of body, especially noticeable in the male. The antennae have the five outer segments widened into a definite club, the tibiae are closely and strongly spinulose. Unknown to the author.

27. EUTRICHOPLEURUS new genus

GENOTYPE: *Trichochrous seriellus* Casey, 1895. Ann. N. Y. Acad. Sci., VIII, p. 506 [=*Eutrichopleurus seriellus* (Casey)].
Genotype locality: Utah, (Casey).

Form elongate oval, body clothed with dense subdecumbent cinereous pubescence, intermixed, at least toward the sides of the elytra with short, erect and sparse cinereous setae which frequently seem to be subserial in arrangement; fringe at the sides of the pronotum usually short, even and close-set. Epistoma connate with the frontal apex. Labrum relatively large, a little wider than long and rounded at apex; articulating membrane smooth, sharply defined by its color from the epistomal apex. Antennae of moderate length, rather robust, gradually and slightly incrassate in both sexes, feebly subserrate. Epipleurae widest at base, thence rather rapidly narrowing to become evanescent opposite the fifth ventral segment; surface plane slightly reflexed. Anterior and middle tibial spurs in the male moderately thickened.

28. EMMENOTARSUS Motschulsky

Bull. Imp. Soc. Moscou, XXXII, (2), p. 394, 1859. (Col. Nouv., Californie.)

GENOTYPE: *Dasytes quadricollis* LeConte, 1859. Proc. Acad. Nat. Sci. Phila., XI, p. 75 [=*Emmenotarsus quadricollis* (LeConte)]. (Present designation.)
Genotype locality: Fort Tejon, California.

Body clothed with short cinereous or blackish subdecumbent pubescence, intermixed abundantly with long hispid hairs, black or cinereous in color; the hairs at sides of the pronotum long, erect and bristling, not forming a regular or close-set fringe. Epistoma connate with the frontal apex. Labrum subparabolic or subcircular; articulating membrane slightly chitinized, brownish to blackish in color and smooth. Antennae moderate in length and more or less different in the sexes as regards slenderness. Eyes oval, comparatively large and moderately prominent, not setose or very slightly so. Epipleurae widest at extreme base, thence gradually narrowing to within a short distance of the apex. Ungual appendages large, quite as long as the claws and free at tip for a short distance. Anterior and middle tibial spurs short and thickened.

29. TRICHOCHROIDES new genus

GENOTYPE: *Trichochrous sexualis* Casey, 1895. Ann. N. Y. Acad. Sci., VIII, p. 524 [=*Trichochroides sexualis* (Casey)].
Genotype locality: Sonoma County, California, (Casey).

The species belonging to this genus are most remarkable in having the disk of the fifth ventral abdominal segment modified at apex in the male. In the genotype the surface of the fifth ventral is deeply emarginate at apex, with the bottom of the emargination rectilinearly transverse, but the concave outline of the notch is continued on the disk past this bottom truncature, forming a rounded depressed sinus with the truncature as its anterior margin and its depressed floor horizontal and flat; the disk is broadly impressed, the impression polished and impunctate toward the margins of the emargination but elsewhere bristling with short erect black and spiculiform setae. The inner spurs of the anterior and middle tibiae are strongly dilated, those of the posterior tibiae but slightly so, in the male and slender in the female. Epistoma connate with the frontal apex. Labrum semi-circular and the articulating membrane smooth and more or less brownish. Eyes prominent and not noticeably setose. Antennae moderate in length, stouter in the male and gradually and slightly incrassate in the distal five segments, the fifth segment triangular and prominent anteriorly; in the female the antennae are somewhat slender. Epipleurae moderately narrow, widest at the base, thence gradually narrowing to become evanescent opposite the fifth ventral segment. Ungual appendages well developed, equal, as long as the claws and free at tip for a short distance.

30. SYDATES Casey

Ann. N. Y. Acad. Sci., VIII, p. 537, 1895. (Coleopt. Notices, VI.)

GENOTYPE: *Sydates zonatus* Casey, 1895. Ann. N. Y. Acad. Sci., VIII, p. 537. (By monotypy.)
Genotype locality: El Paso, Texas.

Body rather stout and oblong. Antennae long and strongly serrate. Epipleurae very narrow and distinct, slightly wider toward base, with their surface plane inclined upward externally. Anterior tibiae with a few long, slender bristle-like spines along the outer side, much less noticeable than in *Trichochrous*. Ungual appendages acutely pointed and leaving nearly one-half of the inner claw free. Casey states that the general habitus and ornamentation of body is remindful of *Listrus*.

31. LISTROMIMUS Casey

Ann. N. Y. Acad. Sci., VIII, p. 538, 1895. (Coleopt. Notices, VI.)

GENOTYPE: *Listromimus sericatus* Casey, 1895. Ann. N. Y. Acad. Sci., VIII, p. 538. ♂. (Original designation.)
Genotype locality: Reno, Nevada.

Sculpture opaque, pubescence dense, even and closely appressed. Eyes small and prominent, situated at considerable distance from the base of the head, the neck being narrowed posteriorly. Antennae rather long and slender although incrassate toward apex. Prothorax feebly constricted, basal angles acute and everted. Epipleurae narrow, vanishing far before the apex, but with their surface plane almost horizontal throughout. Anterior tibiae cylindrical, with appressed pubescence and without trace of external spines or setae. Tarsi long and filiform. Ungual appendages as long as the claws, subequal and detached from the outer one-third or one-fourth of the claw.

32. LISTRIMORPHA Blaisdell

Stanford Univ. Publs., Biol. Series, I, (3), p. 188, 1921.

GENOTYPE: *Listrimorpha pallipes* Blaisdell, 1921. Stanford Univ. Publs., Biol. Ser., I, (3), p. 188. (By monotypy.)
Genotype locality: Goldfield, Esmeralda County, Nevada.

Form of a small female *Eschatocrepis constrictus* LeConte, sparsely, uniformly and microscopically pubescent. Eyes large and prominent, not distinctly setose. Epistoma short and connate with the frontal apex. Labrum truncate at apex, transversely oblong, articulating membrane short. Last segment of the maxillary palpi conical. Antennae not at all serrate and with a feeble three-segmented club. Pronotum without submarginal lines, feebly and somewhat broadly impressed within the basal angles; lateral margins very minutely serrulate and feebly fimbriate. Epipleurae rather narrow at base, thence gradually narrower to become evanescent behind the middle; surface plane outwardly reflexed and scarcely defined from the elytral surface. Legs very slender, middle and posterior tarsi elongate and filiform, tibial spurs not discernable. Ungual appendages (Pl. II, fig. 19) slightly longer than the claws, equal, attached nearly throughout their length, subacute on the middle and posterior claws.

33. ADASYTES Casey

Ann. N. Y. Acad. Sci., VIII, p. 539, 1895. ♂. (Coleopt. Notices, VI.)

GENOTYPE: *Adasytes laciniatus* Casey, 1895. Ann. N. Y. Acad. Sci., VIII, p. 539. ♂. (Original designation.)

Genotype locality: San Diego, California.

In general habitus resembling certain forms of "*Trichochrous*", type more closely allied to *Listrus*. Anterior tibiae completely devoid of short stout spinules, these replaced by few long slender black and anteriorly inclined bristles. In facies completely different from *Listrus*, lateral pronotal margins even and not serrulate. The hypomera have a large rounded and deep impression near inner edge anteriorly. Color black, head and pronotum with bluish-metallic lustre, elytra slightly piceous; femora black, tibiae and tarsi rufo-piceous; antennae black, second segment pale. Pubescence rather long, sparse and semi-erect, blackish anteriorly, cinereous toward the sides of pronotum, lateral margin fringe well developed, dense, even and black, brownish-black on the elytra, a few cinereous hairs scattered along the suture and on the flanks, upper surface devoid of long erect setae. Fifth ventral segment of abdomen truncate at apex and somewhat impressed on the disk from side to side in a posteriorly arcuate area.

Casey states that the form is narrow, parallel, rather convex and polished black. Inner spur of the anterior and middle tibiae dilated, with the tip obtuse but acutely pointed at middle of apex.

34. LISTRUS Motschulsky

Bull. Imp. Soc. Moscou, XXXII, (2), p. 389, 1859. (Col. Nouv. Californie.)

GENOTYPE: *Listrus punctatus* Motschulsky, 1859. Bull. Imp. Soc. Moscou, XXXII, (2) p. 390. (Present designation.)

Genotype locality: Ross, Sonoma County, California (Motschulsky).

Form elongate and more or less parallel; vestiture unicolorous or variegated, without intermixed setae. Eyes large and prominent, not noticeably setose. Antennae (Pl. I, fig. 22) relatively short, varying in the species. Pronotum more or less dilated toward base, lateral margins minutely serrulate and having a well developed close-set fringe of short, posteriorly and superiorly recurved hairs; apical angles always very obtusely rounded. Epipleurae moderately narrow at base, thence gradually narrowing, with their surface plane strongly inclined upward throughout, becoming evanescent opposite the apex of the fifth ventral segment. Tibial spurs present, those of the anterior and middle tibiae more or less modified. Ungual appendages thick, equal and fully as long as the claws, with the apical third or fourth free.

When Col. Casey wrote the Coleopterological Notices, VI, *Listrus punctatus* was unknown to him. Among other species that the author collected in 1889 and submitted to him for determination, he recognized *punctatus*. It has been collected in recent years.

35. LISTROPSIS Blaisdell

Can. Ent., LVI, p. 1, (Jan.), 1924.

GENOTYPE: *Listropsis tinctus* Blaisdell, 1924. Can. Ent., LVI, p. 1. (Original designation.)

Genotype locality: Mojave, California.

Body sublistriform. Pubescence sparse and dual in character. Antennae moderate in length, slightly subserrate and feebly incrassate distally. Eyes large and prominent, not noticeably setose. Epistoma connate with the frontal apex and not defined. Labrum slightly wider than long and rounded at apex; surface quite strongly convex from side to side, articulating membrane smooth, pale and devoid of punctures or hairs. Pronotum slightly dilated toward base, disk without submarginal lines, margins not serrulate and without a close-set fringe. Elytral margins fimbriate with moderately long hairs that are not close-set. Epipleurae narrow, gradually narrowing to opposite fifth ventral abdominal segment, thence obsolete; inner margin well defined to near apex, the outer obsolescent beyond the middle toward apex, with the surface plane somewhat reflexed. Anterior tibiae without spinules externally; anterior and middle tibial spurs dilated and transversely truncate at apex. Ungual appendages well developed and as long as the claws.

In the original discussion of the genotype it was stated, that the epipleurae are quite horizontal and that their surface plane is inclined to turn upward; also, that the distinctly aeneous lustre of the upper surface, rufous trochanters, tibiae and tarsi, as well as the sparse pubescence, intermixed with long bristling hairs, constitute very salient characters. In the male type the fifth abdominal ventral segment is impressed at middle of apex.

EXPLANATION OF PLATES

The figures are camera lucida tracings with sufficient detail to emphasize generic characters.

PLATE I

Fig. 1.—Head of *Pristoscelis grandiceps* LeConte, male, showing the labrum in complete retraction, visible part of the articulating membrane appearing as a bead at apex of the connate epistoma, the latter completely undifferentiated from the frons.

Fig. 2.—Head of second specimen of *Pristoscelis grandiceps* LeConte in the author's collection, male, showing the labrum in complete extension, with the smooth articulating membrane fully exposed.

Fig. 3.—Head of *Vectura longiceps* Casey, showing the labrum in full extension, the smooth articulating membrane and the very feebly indicated connate epistoma; head moderately elongate.

Fig. 4.—Head of *Hoppingiana hudsonicus* LeConte. Head very short before the eyes; epistoma wholly connate with the frons; articulating membrane narrowly exposed.

Fig. 5.—Head of *Amphivectura monticola* Blaisdell. Epistoma defined by a feeble transverse, raised line from the frontal apex, its surface punctate, the articulating membrane smooth and pale.

Fig. 6.—Pronotum of *Vecturoides serrulata* Blaisdell, female.

Fig. 7.—Right front leg of *Byturosoma fuscus* LeConte, female, inner surface.

Fig. 8.—Epipleura of *Allonyx denudatus* Casey.

Fig. 9.—Epipleura of *Amphivectura monticola* Blaisdell.

Fig. 10.—Epipleura of *Leptovectura adspersa* Casey.

Fig. 11.—Epipleura of *Cradytes serricollis* LeConte.

Fig. 12.—Epipleura of *Vecturoides pseudonycha* Fall, male.

Fig. 13.—Epipleura of *Pristoscelis grandiceps* LeConte.

Fig. 14.—Epipleura of *Eudasytes amplus* Casey, male.

Fig. 15.—Protibia of *Trichochrous oregonensis* Casey.

Fig. 16.—Inner surface of left elytron of *Dolichosoma foveicollis* Kirby, showing the inflexed epipleura.

Fig. 17.—Pronotum of Vecturoides pseudonycha Fall.

Fig. 18.—Pronotum of *Vectura longiceps* Casey.

Fig. 19.—Left antenna of *Allonyx sculptilis* LeConte, female, Horn collection.

Fig. 20.—Right antenna of *Dolichosoma foveicollis* Kirby, male.

Fig. 21.—Epistoma and labrum of *Centronopus* Solier, showing the normally exposed slightly coriaceous but flexible articulating membrane: A, emargination at the oblique suture; B, articulating membrane.

Fig. 22.—Left antenna of *Listrus pardalis* Casey, male.

Fig. 23.—Pronotum of *Amphivectura monticola* Blaisdell.

Fig. 24.—Head of *Mecomycter omalinus* Horn. Paratype Horn collection, showing an epistoma.

Fig. 25.—Epistoma and labrum of *Tarpela micans* Fabricius, showing the normally exposed coriaceous articulating membrane. A, epistoma: B, labrum.

Fig. 26.—Pronotum of *Eschatocrepis constrictus* LeConte, showing subapical constriction.

PLATE II

Fig. 1.—Ungual appendages of *Rhadalus testaceous* Lec. (Subfamily Rhadalinae.)

Fig. 2.—Ungual appendages of *Pristoscelis* LeConte. (A male, *grandiceps* LeConte.)

Fig. 3.—Ungual appendages of *Eschatocrepis* LeConte. (A male, *constrictus* Lec.)

Fig. 4.—Ungual appendages of *Dasytes* Paykull.

Fig. 5.—Ungual appendages of *Dasytellus* Casey.

Fig. 6.—Ungual appendages of *Hoppingiana* Blaisdell. (A female, *hudsonicus* LeConte.)

Fig. 7.—Ungual appendages of *Vecturoides* Fall. (*pseudonycha* Fall.)

Fig. 8.—Ungual appendages of *Leptovectura* Casey. (*adspersa* Casey.)

Fig. 9.—Ungual appendages of *Allonyx* LeConte. (*sculptilis* LeConte.)

Fig. 10.—Ungual appendages of *Pseudallonyx* Casey. (*plumbeus* LeConte.)

Fig. 11.—Ungual appendages of *Vectura* Casey. (*longiceps* Casey.)

Fig. 12.—Ungual appendages of *Eudasytes* Casey. (A female *hirsutus* Blaisdell.)

Fig. 13.—Ungual appendages of *Asydates* Casey. (A male *explanatus* Fall.)

Fig. 14.—Ungual appendages of *Cradytes* Casey. (A male, *serricollis* LeConte.)

Fig. 15.—Ungual appendages of *Eutrocholistra* Blaisdell. (A male, *punctatus* Blaisdell.)

Fig. 16.—Ungual appendages of *Byturosoma* Motschulsky. (A male, *fuscus* LeConte.)

Fig. 17.—Ungual appendages of *Vecturoides* Fall. A female, (*serrulata* Blaisdell).

Fig. 18.—Ungual appendages of *Trichochrous* Motschulsky. (*oregonensis* Casey.)

Fig. 19.—Ungual appendages of *Listromorpha pallipes* Blaisdell.

Fig. 20.—Ungual appendages of *Dolichosoma foveicollis* Kirby.

Fig. 21.—Metatarsus of *Dasytastes maculatus* Blaisdell.

Fig. 22.—Right metatarsus of *Dolichosoma foveicollis* Kirby.

Fig. 23.—Metatarsus of *Vecturoides pseudonycha* Fall.

Fig. 24.—Frons and labrum of *Trichochrous oregonensis* Casey.

Fig. 25.—Right antenna, male, of *Cradytes serricollis* LeConte.

Fig. 26.—Right antenna, male, of *Byturosoma fuscus* LeConte.

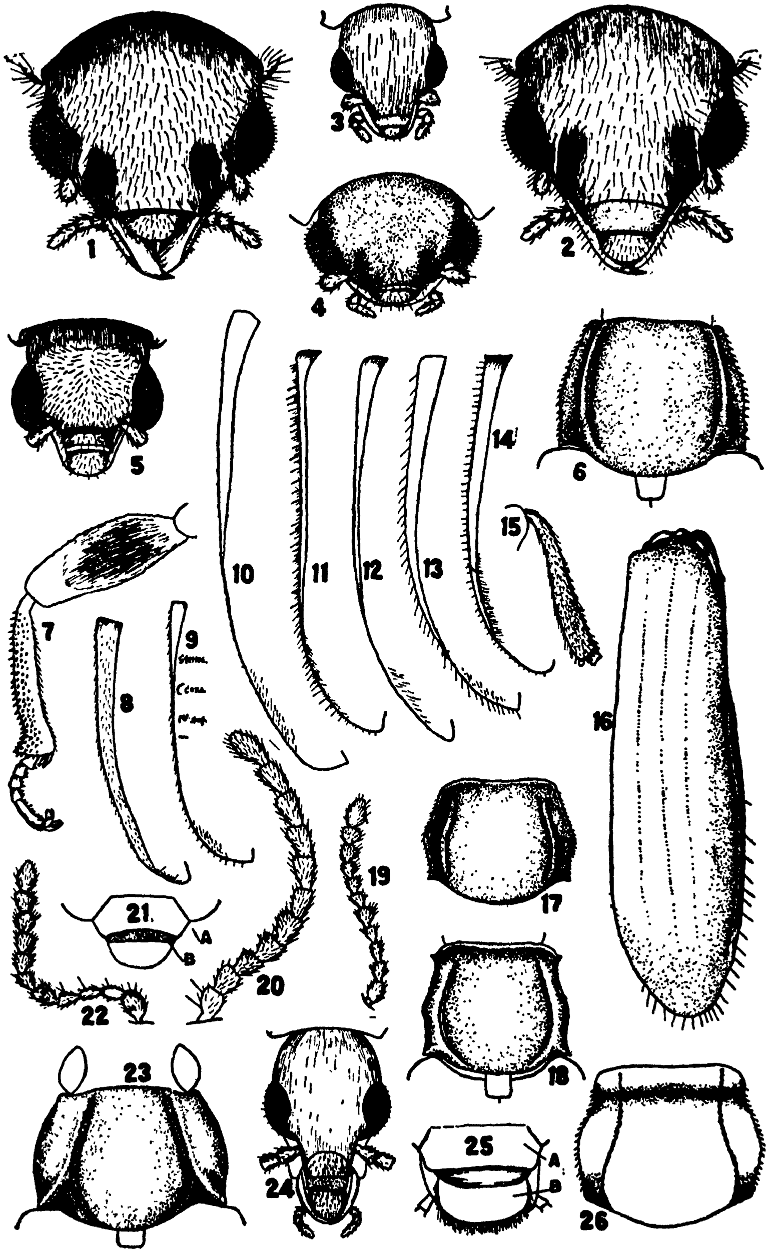
Fig. 27.—Left antenna, female, of *Dolichosoma foveicollis* Kirby.

Fig. 28.—Right antenna, male, of *Vecturoides pseudonycha* Fall.

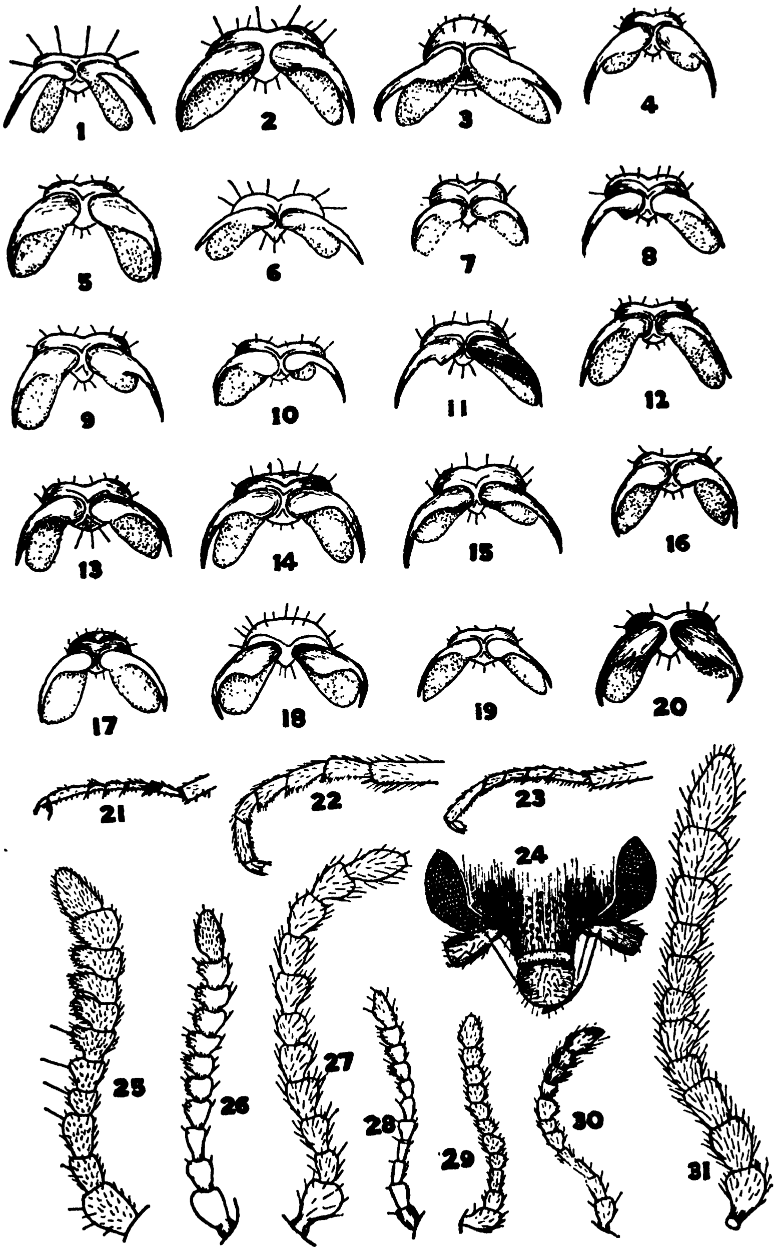
Fig. 29.—Left antenna, female, of *Amphivectura monticola* Blaisdell.

Fig. 30.—Left antenna, of *Vectura longiceps* Casey.

Fig. 31.—Left antenna, of *Eschatocrepis constrictus* LeConte.



BLAISDELL—NORTH AMERICAN DASYTINI



BLAISDELL—NORTH AMERICAN DASYTINI

NEW GENERA AND SPECIES OF WEST INDIAN MANTIDAE AND PHASMIDAE

(ORTHOPTERA)

BY JAMES A. G. REHN AND MORGAN HEBARD

(Plates III and IV)

Some ten years ago the present authors prepared the manuscript of a study of the Mantidae and Phasmidae of the West Indies basing it particularly on the collections then in hand. Numerous factors have delayed the publication of this work, and during the intervening years a large amount of important and greatly amplifying West Indian material of these families has been received. Until there is a suitable opportunity to study this comprehensively, and the original manuscript has had the extensive revision and reconstruction this will entail, its publication is not desirable.

However, in order to facilitate future work it seems obligatory to present descriptions of the two new genera, eight new species and one new subspecies brought to light by this work of a decade past, and the same have been abstracted from the manuscript and are here presented. Certain comments on the genus *Antillophilus* Carl, and specifically *A. restrictus*, on *Clonistria simplicitarsis*, and on the nominate form of *Diapherodes gigantea* are also given to amplify the remarks on related types.

Generally understood abbreviations have been given for the names of institutions owning material here reported. The absence of any qualifying set of initials after records indicates the material in question is the property of the Academy of Natural Sciences of Philadelphia.

MANTIDAE

THESPINAE

LIGUANEA[1] new genus

This remarkable genus is related to *Musonia* Stål, differing from all other genera assigned to the Thespinae, excepting the genus *Galapagia* Scudder, in the marked reduction of the cephalic tibial spines. From *Galapagia*, however, the present genus differs widely in showing no tendency toward the Oligonicinae in the placement of these spines, nor are the juxta-ocular portions of the vertex produced.

Compared with *Musonia*, the present genus shows close agreement in the size, general form and proportions, head and general character of limbs. The shaft of the pronotum is more slender than in *Musonia surinama* (Saussure), while the cephalic femora have the small ventro-external pregenicular spine smaller. In the ventral margins of the cephalic tibiae being armed with two external and three internal spines this insect will readily be distinguished from all of its allies.

Genus monotypic. Genotype: *Liguanea pediodromia* new species.

To complete the generic diagnosis, the following features are noted. Head with dorsal margin of vertex slightly above eyes, the juxta-ocular portions rounded but not produced, the sulci scarcely interrupting the transverse dorsal outline; frontal scutellum nearly five times as wide as deep, its dorsal margin transverse. Pronotum slender, supra-coxal expansion evident and angulate, shaft decidedly longer than collar and with a delicate medio-longitudinal carina. Female ultimate tergite (supra-anal plate) almost as long as cerci. Cephalic coxae reaching to caudal margin of pronotum.

Liguanea pediodromia new species (Pl. III, figs. 1 and 2.)

Readily separated by the generic characters given above, individuals of this species superficially resemble those of *Musonia surinama* (Saussure). The lower dorsal margin of the vertex and the slightly more slender pronotal shaft are, in addition, ready recognition features.

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[1] From the Liguanea Plain, in which the genotypic species was collected.

Type.—♀; Liguanea Plain, near Kingston, Jamaica. July 5, 1920. (M. Hebard). [Hebard Collection, Type no. 861].

The following characters, additional to those already given, are of specific value.

Size small; form rather slender, average for the Group Musoniae. Head with ocelli very minute, as in this sex of *M. surinama;* the surface dorsad of these slightly more even than in that insect. Lateral margins of pronotum minutely denticulate, slightly but distinctly stronger in this respect than in *M. surinama.* Mesonotum and metanotum as in *M. surinama,* with lateral contour of rudiments of the organs of flight shown as in immature males. Medio-longitudinal carina seen in pronotum continued to apex of abdomen. Ultimate abdominal tergite (supra-anal plate) triangular, less than twice as long as proximal width, with apex sharply rounded. Cercal joints shorter than in *M. surinama.* Spines of cephalic tibiae all large, the proximo-external the smallest, the disto-internal the longest, the series all increasing evenly in length distad. As in *M. surinama,* the median and caudal tibiae are each armed with a distal pair of minute spines, while the caudal tarsal articles distad of the metatarsus are about two-thirds as long as the latter.

Allotype.—♂; Flamstead, Jamaica. September 10, 1921. (C. C. Gowdey). [Academy of Natural Sciences of Philadelphia].

Differs from female as does the male from the female of *M. surinama.* Size smaller, form more slender. Ocelli large, arranged in a transverse triangle. Tegmina and wings extending to distal portion of abdomen. Ultimate abdominal tergite (supra-anal plate) triangular, medio-longitudinally carinate proximad, about one and one-third times as long as proximal width. Ultimate sternite (subgenital plate) as in *M. surinama,* except that the styles are more approximate and separated by but a short interval.

Coloration.—Female. General coloration sayal brown; the pronotal shaft, mesonotum and metanotum with a weak, irregular suffusion of dark brown on each side. Head with caudal portion of occiput and cephalic portion above median ocellus darker, but with crest of occiput congo pink. Cephalic coxae and median and caudal limbs darker, snuff brown. Dorsal portion of genicular lobes of cephalic femora with a fleck of snuff brown. Over the entire insect the bases of the minute hairs, some of which are weakly tuberculate, are seen under the lens to be dark brown.

Male. General coloration yellow brown. Tegmina and wings transparent grayish brown, the veins of the discoidal field of the tegmina and distad on the wings with numerous very minute flecks of dark brown. This is a noteworthy feature, as such marking does not occur in *M. surinama.*

The measurements of the male allotype and female type are as follows: length of body, ♂, 27 mm.; ♀, 28.3: width of head, ♂, 2.6; ♀, 3.2: length of pronotum, ♂, 5.8; ♀, 8: length of pronotal shaft, ♂, 3.8; ♀, 4.8: width of pronotal supra-coxal expansion, ♂, 1.3; ♀, 2.2: median width of pronotal shaft, ♂, .9; ♀, 1.6: length of tegmen, ♂, 16: length of cephalic coxa, ♂, 4; ♀, 5.1: length of caudal tibia, ♂, 8.7; ♀, 7.7: length of caudal metatarsus, ♂, 3.9; ♀, 3.3.

Specimens examined: 4; 2 males, 1 female and 1 immature individual.

JAMAICA: Liguanea Plain, near Kingston; VII, 5, 1920; (M. Hebard; on dry mimosa-covered plain, in grassy undergrowth about clusters of vine-covered plants); 1 ♀ (*type*), 1 juv. ♂; [Hebard Cln.]. Flamstead; IX, 10, 1921; (G. C. Gowdey); 1 ♂ (*allotype*). Milk River, Clarendon Parish; I, 8-12, 1920; (R. Stanway Parris); 1 ♀ (*paratype*).

OLIGONICINAE

Thesprotia caribea new species

1922. *Thesprotia subhyalina* Caudell (not *Oligonyx subhyalina* Saussure, 1870), Univ. Iowa Studies in Nat. Hist., x, p. 29. (In part.[2]) [♂, ♀, juv.; Antigua.]

Compared with *T. filum* (Lichtenstein), the present insect is found to agree closely in all features except size and form. The Antiguan insect is, however, so much smaller and yet proportionately less slender that we believe it must be recognized as a distinct species. As a result, the following description fits *filum* (previously very inadequately described) quite as well except in the features noted, which are best shown by the comparative table of measurements here given.

Type.— ♀; Antigua, British West Indies. June, 1918. (D. Stoner). [United States National Museum].

Size rather small and form less slender than is usual in this genus of medium-sized and extremely slender mantids. Head with juxta-ocular portions of occiput produced in small but prominent, rounded triangular projections, the intervening dorsal margin showing a trace of concavity. Antennae very fine, about as long as depth of head. Ocelli absent, the areas where the lateral ocelli would have been located if present, each occupied by a short, curved, delicate carina. Fascial scutellum very small, strongly transverse, dorsal margin broadly flattened convex, but this continued beneath the antennae on each side as a short, transverse boundary.

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[2] The male from Trinidad recorded by Caudell represents *T. filum* (Lichtenstein), a very closely related species, described from Surinam. Material of *filum* is also before us from Trinidad, (immature and adult females) and the Ireng River, Roraima, Brazil, (immatures).

Pronotum unusually short for genus,[3] the cephalic coxae reaching a point distinctly nearer its caudal margin than in *filum;* collar truncate cephalad, its lateral margins very finely denticulate; supra-coxal expansion moderately prominent; shaft with lateral margins even more finely denticulate, but with those denticulations which are darker and well separated slightly heavier than the others; surface smooth with medio-longitudinal carina well indicated, weaker and gradually disappearing cephalad on collar, which shows weak lateral surface carinae in addition. Tegmina and wings indicated only as rudimentary caudo-lateral projections of the mesonotum and metanotum. Ultimate tergite (supra-anal plate) tectate, elongate triangular with apex rounded, distinctly less than three times as long as proximal width (in *filum* proportionately narrower). Limbs and armament of the same as characteristic of *Thesprotia.*

Allotype.— ♂ ; same data as type. [United States National Museum].

Agrees with female except as follows. Size somewhat smaller, form distinctly less robust. Antennae very fine, but extending as far as caudal extremity of metanotum. Large ocelli present, forming an equilateral triangle. Tegmina and wings fully developed; the former showing striking though very fine marking, which, however, is the same as in *filum.* Apex of abdomen missing.

Measurements (in millimeters)

	Length of body	Length of pronotum	Least width of pronotal shaft	Length of tegmen	Length of caudal femur
♂					
T. caribea.					
Antigua. *Type.*	42	10.3	1.1	17.7	7.8
T. filum.					
Trinidad	49[4]	14.2	1.1	20.7	9
♀					
T. caribea.					
Antigua. *Allotype* ...	37.8	12.1	1.2	—	8.2
T. filum.					
Caparo, Trinidad[5] ..	56.7	19	1.2	—	10.7
Caparo, Trinidad[6] ..	57	19.2	1.2	—	10.8

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[3] The genus, as at present restricted, is discussed by Giglio-Tos, Bull. Soc. Ent. Italiana, XLVI, p. 195, (1914).

[4] Estimated. Apex of abdomen missing.

[5] Belonging to the United States National Museum, taken by A. Busck, in March.

[6] Belonging to the Hebard Collection, taken by S. M. Klages, in August, 1913.

Coloration (from material apparently dried after immersion in alcohol).—Female buffy, with a few inconspicuous flecks of brown on shaft of pronotum and at well spaced intervals on its lateral margins.

Male buffy, suffused with dark brown at the ocelli. Tegmina and wings hyaline with a very faint buffy tinge; the former in entire distal portion and latter in anterior field with transverse veinlets each very dark brown for a short distance at their intersection with the true longitudinal (but not the intercalated) veins. These dark sections are about one-fourth to one-third the width of the interval between the veins.

The six additional females of this species, recorded by Caudell, may be considered paratypes.

PHASMIDAE

PHIBALOSOMINAE

Lamponius dominicae new species (Pl. III, figs. 3 and 4.)

The species of this genus all appear to be rather closely related. The male of *dominicae* is nearest that of *L. portoricensis* Rehn,[7] differing in having longer cephalic and median limbs, and the medio-longitudinal carina of the ventral surface of the median and caudal femora weak and unspined. The male of *L. guerini* (Saussure) [8] is described by Redtenbacher as being much more rugulose and carinulate. The male ultimate tergite in *dominicae* is broader and blunter than in *portoricensis,* as figured by Redtenbacher (under the synonymic name *klugi*).

Type.—♂; Laudet, Dominica. June 12, 1911. (F. E. Lutz). [American Museum of Natural History].

Size and form medium for males of the genus. Head with a few scattered granulations, which become larger toward the caudal margins, the two laterad there being well produced. Pronotum smooth, with a few small granulations (which are very weak in paratype). Mesonotum weakly granulate cephalad, this condition becoming subobsolete caudad. Metanotum and abdominal tergites smooth, the sixth, seventh and eighth with a few small transverse impressions dorsad at the caudal margin. Eighth tergite with lateral margins straight. Ninth tergite moderately cucullate, broader than long; disto-lateral margins convergent to the broadly rounded, blunt apex, the plate at these margins narrowly horizontal. Femora moderately stout, the cephalic unarmed but with a distal medio-longitudinal carina on the ventral surface, this very weak on median and caudal femora. Median femora with ventral margins armed with one to two internal and none to two external heavy distal spines; caudal femora armed with two internal and two or three external spines.

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[7] Trans. Amer. Entom. Soc., XXIX, p. 132, (1903). [Juv. ♂ (nec ♀); Fajardo, Porto Rico.]

[8] *Pygirhynchus guerini* Saussure, Rev. et Mag. de Zool 2e sér., XX, p. 64. [♀; Guadeloupe.]

General coloration buffy brown to tawny olive, limbs weakly mottled with a darker suffusion. The intersections of the tergites are very narrowly slightly darker, possibly due to discoloration.

Of the two males before us, the measurements of the type are given first. Length of body, 58.5 and 60.8 mm.; length of mesonotum, 13.4 and 14.4; median width of mesonotum, 2.7 and 2.7; length of metanotum (including median segment), 8.8 and 9.2; length of median segment, 3.9 and 4.1; length of cephalic femur, 11.2 and 12.2; length of median femur, 9 and 10.2; length of caudal femur, 12 and 13 mm.

A paratypic male is before us, bearing the same data as the type. A very small immature individual from Dominica, taken on April 26, 1910 (P. B. Whelpley) has also been examined.

ANTILLOPHILUS Carl

1913. *Antillophilus* Carl, Rev. Suisse de Zool., xxi, p. 38, pl. 1, fig. 6.

This genus was erected to include the single species *A. brevitarsus* Carl, from the Island of Guadeloupe. To it also belongs the species described as *Pericentrus restrictus* by Redtenbacher. The unique female type of the latter species was unquestionably immature and a female now before us shows a decidedly stronger armament of spines and lamellate plates. This specimen is adult or in the instar preceding maturity.

The genus is closely related to *Lamponius* Stål, differing in the heavily spined occiput and body, the large foliate lamellae of the abdominal tergites (on the second to sixth[9] in *brevitarsus* of which those of the sixth are much the largest, on the sixth only in *restrictus*), the femora with margins lamellate and ventral surface of median and caudal femora strongly convex between these, and the triangularly lamellate plates and spines of the femora and dorsal margins of the tibiae.

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[9] On the third to seventh, as stated by Carl, if the median segment be counted as the first abdominal tergite.

This genus and *Lamponius* may be readily separated from *Pericentrus* (as now restricted exclusively an Old World genus [10]) by the very short tarsal joints, the metatarsus being only very slightly longer than the succeeding joint, which is but slightly longer than broad. It is probable also, that the male sex of *Antillophilus* will be found to lack organs of flight, as in *Lamponius*.

Antillophilus restrictus (Redtenbacher)

1908. *P[ericentrus] restrictus* Redtenbacher, Insektenfamilie der Phasmiden, p. 353. [[Juv.] ♀; Porto Rico.]

PORTO RICO: Arecibo; III, 4, 1914; (F. E. Lutz; at waterfalls on road to Utuado, on tree and fern covered limestone cliffs); 1 nearly adult or adult ♀; [A.M.N.H.].

In this species the lamellation of the dorsal margins of the femora is much more decided than in *brevitarsus*. The body spines and triangularly lamellate plates of the dorsal carinae of the limbs are also decidedly more prominent than in that species, the abdominal tergites preceding the sixth, however, being destitute of lamellae.

This specimen shows the following complex armament. Head with two slender erect spines between the eyes curved cephalad, occiput with four large erect spines on each side, the caudal two on each side fused at their bases, a small spine laterad of these on each side.

Pronotum with two pairs of spiniform tubercles on cephalic portion and two pairs of spines on caudal portion, of which the extreme caudal pair is the longer; lateral margins tuberculate, with a small spine at caudal extremity. Mesonotum heavily armed with large straight spines, two closely-placed heavier spines on each side of the median carina mesad and at the caudal margin. Metanotum and median segment with much smaller spines, but with two similar heavier spines on each side of the median carina at the caudal margin.

First abdominal tergite with four similar spines at caudal margin, which, however, are equidistant. Fifth tergite with a pair of small, irregularly foliaceous, erect lamellate plates dorso-caudad, and on each side a similar plate ventro-caudad which is directed ventrad. Sixth tergite expended into two large horizontal lamellae, with lateral margins rounded but caudal margin bidentate. Sixth and succeeding tergites strongly longitudinally multi-carinate, the seventh and eighth with a pair of very small erect lamellate plates dorso-caudad. Penultimate tergite with small rounded projections of free margin; minute supra-anal plate rounded triangular.

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[10] Genotype selected by Hebard (Trans. Amer. Entom. Soc., XLVIII, p. 359, (1923)), *P. möwisi* Redtenbacher, from Sikkim.

Dorsal and ventral margins of femora and dorsal margins of tibiae armed with triangular lamellae, those of the dorso-caudal of the caudal femora largest, of the dorso-cephalic of the median femora next largest. Median portion of median and caudal femora with dentiform tuberculations. Cephalic femora with no ventro-cephalic and five ventro-caudal, two dorso-cephalic and three dorso-caudal triangular lamellae; median femora with one (and one large tubercle) ventro-caudal, three (and one large denticulate tubercle) ventro-cephalic, four dorso-caudal and four dorso-cephalic triangular lamellae; caudal femora with no (but two large denticulate tubercles) ventro-caudal, two (and two large denticulate tubercles) ventro-cephalic, three (and one proximal tubercle) dorso-caudal and three dorso-cephalic triangular lamellae. Tibiae all with three pairs of triangular lamellae dorsad. Operculum failing to reach apex of abdomen, its lateral margins straight and convergent, then rounding distad, the apex showing weak angulation, the distal portion of the plate ventrad with a delicate medio-longitudinal carina.

Coloration uniform tawny olive.

The measurements of this nearly adult, or adult, female, are as follows: length of body, 52.2 mm.; height of longest occipital spine, 2; length of mesonotum, 11.5; length of metanotum, (including median segment), 7.7; length of median segment, 3.8; length of longest thoracic spine, 1.8; height of lamella of sixth tergite, 2.7; width of lamella of sixth tergite, 3.7; length of cephalic femur, 10; length of median femur, 7.7; length of caudal femur, 9.7; height of largest lamella (on dorso-caudal margin of caudal femur), 2.

This is probably the most intricately specialized species of the West Indian Phasmidae.

CLONISTRIA Stål

In the literature this and allied genera are very poorly defined. We believe that numerous generic units exist, but the characters upon which the recognized genera are separated are unsatisfactory, and complete rearrangement will have to be made before the number of actual genera and their logical limits can be determined. At present *Clonistria* is separated from *Bostra* only by having the metatarsus sulcate in the former, carinate or cristate in the latter. The genotype of *Clonistria*, Stål's *bartholomaea*,[11] is further separated from the genotype of *Bostra*, Westwood's *Bacteria turgida*, by having the median segment equal to

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[11] Which name may prove to be a synonym of *Mantis linearis* Drury.

the restricted metanotum in length, *Bostra* having the median segment half as long as the metanotum.

Unfortunately, in males, it is often difficult to decide whether the metatarsus is sulcate or carinate dorsad, this surface apparently grading from one to the other condition through a series of the different species. The median segment also differs in proportionate length to the metanotum in almost every species, and this feature evidently has no value for generic separation. The junior author has previously discussed this most unsatisfactory situation.[12] It is greatly to be hoped that, in the near future, the genera involved may be thoroughly revised.

Clonistria latebricola new species (Pl. III, figs. 5 and 6.)

This, apparently the smallest known West Indian species of the genus, is uniform light green in coloration, the dorsal surface smooth, the limbs unarmed. The male poculum appears truncate distad when seen from below, but nearly rectangulate emarginate when seen from the rear.

Type.—♂; Rio Cobre near Bogwalk, Jamaica. October 25, 1913. (M. Hebard). [Hebard Collection, Type no. 868].

Size small for the genus; form very slender.

Head longer than pronotum, smooth, tapering caudad. Antennae nearly as long as body. Eye prominent, over half as long as cheek.

Pronotum smooth, with a linear medio-longitudinal sulcation and a broader median transverse one. Mesonotum and metanotum smooth. Median segment decidedly shorter than restricted metanotum.

Abdominal tergites smooth, elongate except the seventh, eighth and ninth, which are short, the eighth slightly shorter than the seventh, which is slightly shorter than the ninth, the ventro-lateral margins of these straight and horizontal; ninth tergite very slightly longer than broad, weakly cucullate with distal margin truncate, showing very faint convexity and armed ventro-mesad with a cluster of short, minute spines. Cerci simple, curved inward, tapering from the rather heavy base to the bluntly rounded apex; between the bases of these projects a plate, with its slender distal portion blunt at apex. Fifth sternite with caudal extremity convex and weakly raised, seventh sternite very small. Poculum very small, cucullate, subchitinous in proximal portion, distal free margin appearing truncate in ventral aspect, rectangulate-emarginate in caudal aspect.

Limbs unarmed. Median femora approximately one and one-half times as long as metanotum with median segment. Metatarsi distinctly sulcate dorsad. Caudal metatarsus very elongate, the succeeding joints only slightly over half as long.

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[12] Trans. Amer. Ent. Soc., XLV, p. 158, (1919).

From a large immature female, bearing the same data as the type, we find that this sex is very similar, the body stouter, the limbs shorter. In this instar the seventh and ninth tergites are slightly longer than the eighth, the latter with latero-caudal angles rounded and caudal margin truncate, while the operculum reaches only slightly caudad of the middle of the eighth tergite.[13]

Coloration uniform, clear fluorite green. Antennae suffused with brown distad.

The measurements of the male type are as follows: length of body, 16.7 mm.; median width of mesonotum, 1; length of metanotum (with median segment), 10; length of median segment, 4.3; length of ultimate tergite, 1.8; length of cephalic femur, 20.9; length of caudal femur, 18.8; length of caudal metatarsus, 5.2.

Specimens Examined: 6; 1 male and 5 immature individuals.

JAMAICA: "Jamaica", 1 large juv. ♀, (*paratype*).[14] Rio Cobre near Bogwalk; X, 25, 1913; (M. Hebard; very scarce in scanty vines under low hillside forest, dark area with little ground vegetation); 1 ♂, 1 large juv. ♀ (*type* and *paratype*); [Hebard Cln.]. Stony Hill; X, 25, 1913; (M. Hebard; very scarce, beaten from vines of hillside forest); 1 large juv. ♀ (*paratype*); 1 juv.: VII, 5, 1920; (Hebard and Rehn; very scarce, beaten from undergrowth of hillside forest); 1 juv; [Hebard Cln.].

Clonistria bicoloripes new species (Pl. III, figs. 7-9.)

This interesting species, apparently peculiar to the Blue Mountains of Jamaica at high elevations, is nearest *C. latebricola* here described. In the male sex *bicoloripes* is readily distinguished by the buffy brown body and limbs, the cephalic limbs tinged with green and the median and caudal femora green to near their extremities. In addition, *bicoloripes* is larger, decidedly more robust, the median segment very slightly longer (instead of much shorter) than the restricted metanotum, the eighth tergite longer than the ninth, the poculum larger with moderate emargination apparent from below, while the median and caudal femora have the medio-longitudinal carina of the ventral surface forking distad and there feebly lamellate, bearing a few teeth.

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[13] Probably well caudad of this point in the adult condition.

[14] Recorded as *Clonistria* sp. by Rehn, Trans. Amer. Ent. Soc., XXIX, p. 132, (1903).

The female shows this latter feature much more prominently, and differs greatly from that sex of C. simplicitarsis (Gray) in being only a little longer than the male and in having the operculum failing to reach the abdominal apex.

Type.—♂ ; Pleasant Hill House, Blue Mountains, Jamaica. Elevation, 3660 feet. July 31, 1923. (J. A. G. Rehn). [Academy of Natural Sciences of Philadelphia, Type no. 5399].

Size rather small; form slender, but comparatively stout for the genus.

Head slightly longer than pronotum, smooth, tapering caudad, proportionately decidedly heavier than in *latebricola*. Antennae slightly longer than body. Eye prominent, over half as long as cheek.

Pronotum as in *latebricola,* but with medio-longitudinal sulcus more decided in caudal section of cephalic portion. Mesonotum and metanotum smooth, with a mere trace of a medio-longitudinal carina. Median segment decidedly longer than the restricted metanotum.

Abdominal tergites smooth, elongate except distal three, which are short, the eighth as long as the seventh, the ninth distinctly shorter, the ventro-lateral margins of these straight and horizontal. Ninth tergite as long as broad, weakly cucullate, with distal margin truncate and very broadly convex and armed ventro-mesad with a cluster of short, minute spines, this cluster not as deep as in *simplicitarsis*. Cerci simple, tapering from the rather heavy base to the bluntly rounded, incurved apex, the plate between as in *latebricola*. Poculum small, but more prominent than in that species, strongly cucullate, distal free margin broadly rounded obtuse-angulate emarginate in ventral aspect, this emargination appearing stronger and rectangulate in caudal aspect.

Median and caudal femora specialized as described above, this decidedly weaker than in *simplicitarsis*. Median femora about one and one-half times as long as the metanotum and the median segment. Metatarsi distinctly sulcate dorsad. Caudal metatarsus elongate, slightly exceeding the combined length of the succeeding joints.

Allotype.— ♀ ; Near St. Helen's Gap, Blue Mountains, Jamaica. Elevation, 4700 feet. July 22, 1923. (J. A. G. Rehn). [Academy of Natural Sciences of Philadelphia].

Size slightly larger; form much more robust than in male.

Head proportionately more elongate. Antennae reaching to caudal margin of first abdominal tergite. Eye about a third longer than cheek.

Pronotum with medio-longitudinal sulcus very weak.

Seventh tergite about a third longer than eighth, ninth equal in length to eighth. Ninth tergite quadrate with a fine medio-longitudinal carina, caudal margin rounding laterad to the lateral margins. Cerci simple. Operculum elongate, lanceolate, with lateral margins convergent and weakly convex to the acute apex, which fails to reach the apex of the abdomen by a brief distance, distal portion with a decided medio-longitudinal carina.

Limbs heavier, the carinae all decided and the cephalic femora distinctly lamellate. Caudal metatarsus distinctly shorter than the combined length of the succeeding joints.

The coloration of the male sex is discussed above. The female is rich dark brown with a darker postocular streak. The immature individuals are either uniform green or buffy brown.

The measurements of the type are given first for the males. Length of body, ♂, 62 and 64 mm.; ♀, 76: median width of mesonotum, ♂, 1.3 and 1.4; ♀, 3.5: length of metanotum (with median segment), ♂, 10 and 10.2; ♀, 10.8: length of median segment, ♂, 5.7 and 5.9; ♀, 5.6: length of ultimate tergite, ♂, 1.8 and 1.9; ♀, 2.7: length of cephalic femur, ♂, 22 and 23; ♀, 20.2: length of caudal femur, ♂, 19.7 and 20.2; ♀, 17.1: length of caudal metatarsus, ♂, 4.8 and 5.2; ♀, 4.

In addition to the described pair, two male paratypes and a series of eight immature individuals are before us, all bearing the same data as the type, except one male taken at Morce's Gap at 4980 feet, and one immature which was taken with the allotype. The two latter specimens were beaten from grass and bracken-like plants on the slope-face of a trail. The others were secured in old fields, roadside weeds and a tangle beside the trail, the majority at night climbing about high ferns in a garden.

Clonistria monticola new species (Pl. III, figs. 10 and 11.)

1893. *Bacteria cubaensis* Bruner, in Cockerell, Jour. Inst. of Jamaica, I, p. 258. (Not of De Haan, 1842.) [Cinchona, Jamaica.]

The present insect, also apparently peculiar to the Blue Mountains of Jamaica, is nearest *C. bicoloripes* here described, agreeing in the proportionate length of the median segment and general type of distinctive specialization of the median and caudal femora. From the male of that insect the present male may readily be distinguished as it is a decidedly more elongate and more slender insect, the general coloration dark brown, the eighth tergite equal in length to the ninth (as in *C. latebricola* here described). The eyes are more protuberant than in either of the above species, while the supra-anal plate and poculum show higher specialization. In these latter features a tendency toward *C. simplicitarsis* (Gray) is plainly recognizable.

The cerci are shorter and proportionately heavier than in any of the four other Jamaican species of *Clonistria* before us.

Type.— ♂; Cinchona (Hill Gardens), Blue Mountains, Jamaica. July 1, 1923. (C. G. Gowdey). [Academy of Natural Sciences of Philadelphia, Type no. 5571].

Size medium; form very slender for the genus.

Head slightly longer than pronotum, smooth, tapering caudad. Antennae not as long as body. Eye very prominent, globose, half as long as cheek.

Pronotum as in *latebricola.* Mesonotum and metanotum smooth, with the trace of a very fine medio-longitudinal carina slightly more strongly indicated than in *bicoloripes.* Median segment decidedly more elongate than metanotum cephalad of it.

Abdominal tergites smooth, elongate except the three distal, which are short, the seventh becoming inflated caudad and thus appearing pyriform from above, nearly as long as the combined length of the eighth and ninth segments, the eight approximating the ninth in length, the ventro-lateral margins of these straight and nearly horizontal (showing faint declivity caudad); ninth tergite about as long as broad, weakly cucullate, showing weak impression before the caudal margin, which is weakly produced on each side in a blunt node, the margin between these with its concavity approximating their convexity, ventral surfaces of these nodes thickly supplied with minute but stout denticles. Cerci simple, tapering from the rather heavy base to the bluntly rounded, incurved apices, and scarcely twice as long as the proximal width, plate between more broadly trigonal than in *latebricola,* with apex projecting slightly beyond caudal margin of supra-anal plate. Poculum small, in prominence intermediate between that of *latebricola* and *bicoloripes,* strongly cucullate, flattening out latero-distad so that it forms rounded triangular latero-caudal projections, between which its caudal margin is broadly rounded obtuse-angulate.

Median and caudal femora with medio-longitudinal carina of ventral surface forking distad, there lamellate, the lamellations low and each bearing a stout tooth.

General coloration dark brown, the body darkest but head and pronotum paler, except for the face, genae and postocular suffusions of the former, which are black. Limbs slightly paler than body, the apices of the femora and bases of the tibiae very slightly darker. Antennae of the same brown as the limbs, becoming black proximad, except the external surface of the first joint, which is as pale as the head.

The unique type measures: length of body, 74 mm.; median width of mesonotum, 1; length of metanotum (with median segment), 13.7; length of median segment, 8; length of ultimate tergite, 1.8; length of cephalic femur, 23.9; length of caudal femur, 20.6; length of caudal metatarsus, 5.1.

Clonistria annulipes new species (Pl. III, figs. 12 and 13.)

This species is very closely related to *C. simplicitarsis* (Gray).[15] The unknown female of *annulipes* will probably be found to resemble Gray's type closely. The male is apparently distinguishable from males of *simplicitarsis* by genitalic characters alone. In *annulipes* the three last tergites are shorter and broader (the ninth with distal nodes decidedly more approximate and less extensive), the plate between the shorter cerci is bifid at its apex, and the poculum has much less of a lip toward the disto-dorsal margin, which is obtuse-angulate emarginate.

Type.—♂; Montego Bay, Jamaica. December, 1931. (C. G. Hussey). [Hebard Collection, Type no. 946].

Size large and form slender for the genus.

Head longer than pronotum, but broader across the more projecting, bead-like eyes, than in *latebricola* here described; surface smooth, occiput tapering caudad. Antennae nearly as long as body. Eye slightly less than half as long as cheek.

Dorsal surface of body much as described for *latebricola,* except for the three terminal tergites; seventh tergite broadening evenly caudad, its ventro-caudal angles slightly produced; eighth tergite two-thirds as long as seventh, slightly broader than long; ninth tergite as broad as long, slightly longer than eighth, its form moderately cucullate but narrower than seventh, raised and produced mesad in two small, triangularly rounded projections, their internal margins forming an emargination of the distal margin slightly less than a right angle with apex rounded, their ventro-internal surface heavily supplied with short, minute spines. Cerci as in *latebricola,* but apex of plate between their bases heavily bidentate. Poculum rounded rectangulate disto-laterad, much larger and more prominent than in *latebricola,* but with distal margin similar, generally as in *monticola* here described except that the caudal margin is truncate in ventral aspect but rectangulate emarginate in caudal aspect.

Median and caudal femora with a moderately developed medio-longitudinal carina ventrad which forks near the apex and becomes weakly lamellate, there irregularly armed with a very few minute teeth.

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[15] Described from an unknown locality, but apparently one of the Jamaican species of *Clonistria.* We have two species which agree with Gray's description; one is known only from Montego Bay in western Jamaica, the other from localities in the Blue Mountains back of Kingston. It would appear more probable that the latter was the insect described in 1835 and we have so placed our material, describing the other species as *annulipes.*

This insect is grayish, the lower portions of the genae paler. The limbs are brown, the femora darkened distad, this preceded by a broad pale annulus, while their proximal portions are briefly green.

The measurements of the male type are followed by those of a paratypic male taken at Montego Bay in 1910, by E. A. Andrews, and belonging to the United States National Museum. Length of body, 82 and 88 mm.; length of mesonotum, 23.9 and 24.7; median width of mesonotum, 1.3 and 1.3; length of metanotum (with median segment), 15.8 and 16; length of median segment, 7.9 and 7.7; length of ultimate tergite, 2.1 and 2.1; length of cephalic femur, 28.3 and 27.8; length of caudal femur, 27.7 and 25.6; length of caudal metatarsus, 5.9 and 5.7.

Clonistria simplicitarsis (Gray)
(Pl. III, figs. 14 and 15; pl. IV, figs. 16 and 17.)

1756. *Mantis* Browne, History of Jamaica, p. 433, pl. 42, fig. 5.[16] [[♂]; Jamaica.]

1835. *B[acteria] simplicitarsis* Gray,[17] Synop. Spec. Ins. Fam. Phasmidae, p. 43. [[♀]; unknown locality.]

1859. *Bacteria simplicitarsis* Westwood, Cat. Orth. Ins. British Mus., I, Phasmidae, p. 21. (♀ type, better described.)

1893. *Bacteria simplicitarsis* Cockerell, Jour. Inst. of Jamaica, I, p. 258. [Jamaica.]

JAMAICA: Pleasant Hill House, Blue Mountains; 3700 to 3750 feet elevation; VII, 23 and 24, 1923; (J. A. G. Rehn; beaten from brush and vines along trail); 1 ♂, 1 ♀, 1 juv. ♀.

Comparison with the very closely related *C. annulipes* here described is made under that species.

The present male shows the following important characters. Seventh tergite decidedly longer than broad, shaped much like a slender grape seed; eighth tergite shorter than ninth and longer than broad; ninth tergite shorter than seventh, impressed before the caudal margin, which is produced on each side in a rounded ridge terminating in a blunt node, the ventral surface in that area thickly supplied with minute but stout denticles, the distal margin broadly rounded obtuse-angulate emarginate. Cerci much as in *annulipes* but more elongate, the plate between the apices apparently blunt but not bifid. Poculum much as in *annulipes* except that it is more broadly flattened disto-laterad, the caudal margin almost transverse, showing very broad convexity.

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[16] This pre-Linnean figure, though crude, was almost certainly drawn from a male of this species or *C. annulipes* here described. The thickening of the apices of the femora which it shows, was probably induced by the distinctive ventral specialization of the apices of the median and caudal femora.

[17] See page 47, footnote 15.

The far larger female agrees closely with the type as described by Westwood.

Length of body, ♂, 88 mm.; ♀, 155: median width of mesonotum, ♂, 1.3; ♀, 4.2: length of metanotum (with median segment), ♂, 15.7; ♀, 24.1: length of median segment, ♂, 7.8; ♀, 10.8: length of ultimate tergite, ♂, 2.3; ♀, 4: length of operculum, ♀, 14: length of cephalic femur, ♂, 25.3; ♀, 35: length of caudal femur, ♂, 22.2; ♀, 30.7: length of caudal metatarsus, ♂, 5.3; ♀, 4.8.

APLOPLOIDES new genus

This genus is erected to include a single species, *H. stenocephalum* here described. It is related to *Aplopus*, but differs greatly in the long, narrow and smooth head (more closely resembling in that respect the genus *Graeffia* than any other known to us). In addition, the male sex has the organs of flight fully developed, the female sex entirely lacking both tegmina and wings; the ventro-median and ventro-cephalic margins of the median and caudal femora are much more weakly armed distad, and the mesonotum is unarmed but shows a weak medio-longitudinal carina.

Aploploides stenocephalum new species (Pl. IV, figs. 18-21.)

At first glance, males of this species seem to show very close resemblance to males of *Aplopus jamaicensis* (Drury). Comparison, however, shows surprising difference in the head shape, unarmed but weakly carinate pronotum, narrower tegmina, much more slender distal portion of abdomen and much smaller spines of the limbs.

The green, apterous, generally smooth and shining female, with very short limbs, has a very distinctive appearance.

Type.—♂; Pinar del Rio, Pinar del Rio Province, Cuba. September 14, 1913. (F. E. Lutz; five kilometers distant on road to Coloma, river edge, area of bamboo, shrubs and weeds). [American Museum of Natural History].

Size medium; form rather slender, compared with the species of the related genera.

Head twice as long as broad, its greatest width across eyes; its surface smooth, the occiput showing a very few, subobsolete, minute tubercles. Eyes small, their length contained approximately two and one-half times in that of cheek caudad.

Pronotum as long as occiput, with two distinct transverse sulci, the first near the cephalic margin, the second mesad; surface smooth except for several pair of minute tubercles along the faintly impressed median line (these sometimes obsolete). Mesonotum minutely granulose laterad, surface almost smooth (varying to minutely and weakly tuberculate), with a weak but distinct medio-longitudinal carina. Tegmina of the same type as in *Aplopus jamaicensis,* but longer and decidedly narrower; dorsal surface flattened, with a distinct blunt tubercle at shoulders. Wings fully developed, reaching (normally to near apex of) fifth tergite.

Abdomen smooth, with a weak medio-longitudinal carina. Seventh, eighth and ninth tergites decidedly narrower than in *Aplopus jamaicensis,* the last two each slightly shorter than the preceding. Lateral margins of seventh tergite straight and horizontal, of eighth very faintly convex and horizontal, of ninth very faintly convex and very weakly ascending caudad. Apex of ninth tergite sub-bilobate, the ventral surface of each of these lobes distad supplied with a minute cluster of microscopic teeth. Cerci very weakly incurved, almost straight, apices rounded, point of greatest width distad; plate between their bases shield-shaped.[18] Mesosternum smooth (sometimes faintly subgranulate), remaining portions of ventral surface smooth. Poculum (apparently formed by seventh, eighth and ninth sternites) elongate, very weakly cucullate, the distal portion with a delicate medio-longitudinal carina, the apex minutely bilobate.

Limbs as in *Aplopus jamaicensis,* except that the median and caudal femora are not as heavy, their genicular angles acute but not produced in distinct spines, the distal teeth of their ventral margins much weaker, and numbering as follows: median femora, ventro-cephalic, none to two; ventro-median, none to eight; ventro-caudal, none to two: caudal femora, ventro-cephalic, one to two; ventro-median, two to four; ventro-caudal, one to two.

Allotype.— ♀; Twelve and one-half miles south of Pinar del Rio, Pinar del Rio Province, Cuba. September 23, 1913. (F. E. Lutz, region of pines and palmettoes, taken from pine). [American Museum of Natural History].

Size much larger than male; form decidedly more robust; smooth and shining, apterous.

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[18] In *Aplopus jamaicensis* this plate is heavy and convex proximad, thence produced in a stout, elongate, recurved spine, while the broader bilobation of the ultimate tergite is supplied with a much larger cluster of microscopic teeth on each side ventro-distad.

Head as in male, except that the occiput is more convex, so that the greatest cephalic width is mesad on occiput. Eyes even less prominent than in male, their length contained nearly four times in that of cheek caudad.

Surface of head and pronotum otherwise similar. Remaining portions of dorsal surface with a distinct medio-longitudinal carina, slightly heavier on mesonotum. Median segment slightly longer than metanotum. Ninth abdominal tergite shorter than seventh, but longer than eighth, its apex bilobate. Ventral surface as in male. Operculum very elongate, extending beyond apex of abdomen about two-fifths its total length, medio-longitudinally carinate distad; its lateral margins very broadly convex-convergent distad to the acute apex.

Limbs much as in male, except that they are very much shorter in proportion, their spines similar but slightly larger.

Coloration.—Male. Tiber green, varying individually toward light oriental green. Head with broad and striking longitudinal post-ocular bars and a very faint (sometimes subobsolete) medio-longitudinal line of white on occiput. Antennae suffused with brown, particularly distad and at the intersection of the joints. Marginal field of tegmina transparent, white with costal margin narrowly brown. Wings proximad with marginal field similar except that the costal margin is colorless, this stripe continued in this field only between the two principal veins; radiate field transparent, white. Cerci and apex of poculum suffused with brown.

Female. Similar to male, the body (probably due to discoloration) slightly more yellowish green. Head markings even more conspicuous. Medio-longitudinal carina of dorsal surface, medio-longitudinal sulcation of pronotum and lateral longitudinal carinae of abdomen buffy. Ventral halves of mesopleura and metapleura ochraceous-tawny, their ventral margins (very narrowly in two examples, broadly and conspicuously in one) white.

A large immature male before us from Cerro Cabras differs in having the mesonotum very strongly granulate, the pleura, mesosternum and metasternum slightly less granulate. In the early stages the cephalic femora are seen to be strongly lamellate.

The measurements of the type are given first for the males, of the allotype first for the females. Length of body, ♂, 73, 78 to 76 mm.; ♀, 91.5, 88 to 95: length of head, ♂, 5.2, 5.3 to 5.4; ♀, 6.7, 7.1 to 7.1: greatest width of occiput, ♂, 2.8, 2.8 to 2.9; ♀, 4.3, 4.8 to 4.6: length of mesonotum, ♂, 10.8, 11.8 to 12; ♀, 15.9, 15.2 to 16.3: greatest width of mesonotum, ♂, 1.8, 1.8 to 1.9; ♀, 4.9, 5.7[19] to 5.2: length of tegmen, ♂, 9.1, 9.1, 9.1: length of wing, ♂, 38, 40.3 to 37.2: length of metanotum (with median

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[19] The body is somewhat flattened out in this specimen.

segment), ♂, 13, 12.3 to 13.6: length of cephalic femur, ♂, 13.8, 14.6 to 14.1; ♀, 13.7, 12.9 to 13.7: length of caudal femur, ♂, 15, 16.2; ♀, 16.8 15.4 to 17: length of operculum, ♀, 20.2, 19.

In addition to the type and allotype, a series of three male and two female paratypes is before us, bearing the same data as the allotype. We have also examined one large immature male and three small immature individuals, from the collection of the American Museum of Natural History, taken at Cerro de Cebras, Pinar del Rio Province, Cuba, September 11, 1913, by C. W. Leng, who beat these from pine in a dense forest, at about four hundred feet elevation.

APLOPUS Gray

Peculiar to the West Indies and the adjacent coasts many species of this genus, *Aplopoides* and *Diapherodes* are already known and there is every reason to believe that numerous yet undescribed species exist.

Of these genera the outstanding feature which has been used to separate *Aplopus* from *Diapherodes* is the striking expansion of the mesonotum in females of the latter. That distinct genera are represented by the genotypes *Aplopus jamaicensis* (Drury) and *Diapherodes gigantea* (Gmelin) there is no doubt, but the female of the former is now known and shows about as great mesonotal expansion as does the latter. The great majority of the species referred to *Aplopus,* of which the female sex is known, show no expansion of the mesonotum whatever, and furthermore *micropterus* (St. Fargeau and Serville) and its close allies exhibit very decided differences from the others, in features some of which may easily be worthy of generic recognition. Further investigation brings out the fact that so different are *Diapherodes laevicollis* Redtenbacher and *venustula* (Serville) from the genotype, that it appears more than probably here again a distinct generic unit is indicated.

Although all of the species of these genera are large, strikingly built and often brilliantly colored, series are very rarely secured, and many of the described species are known only from one of the sexes. More material than is now available will be necessary before a correct understanding of the validity and relationship of a number of the already characterized forms can be obtained.

Diapherodes gigantea gigantea (Gmelin)

1773. *Mantis gigas* Drury, Illustr. Nat. Hist. Exotic Ins., II, p. 89, pl. 50, fig., index, 2nd page. (Not of Linnaeus, 1758.) [[♀]; St. Vincent.]

1788. *Mantis gigantea* Gmelin, Syst. Nat., I, (4), p. 2055. [Reference to Drury; Italy, in error.]

Both *Mantis angulata* Fabricius and *Cyphocrana cornuta* St. Fargeau and Serville, have been placed as synonyms of this huge walking-stick.

GRENADA: St. George; III; (A. Agassiz); 1 ♀; [M.C.Z.]. No further data; 1 ♀: VIII, 1910; (C. T. Brues); 1 large juv. ♀; [M.C.Z.].

"West Indies": no further data; (H. A. Ballou); 1 ♀.

The immature individual shows that great care must be taken in studying the later instars, as compared with the adult condition, of this species. The present immature female is 143 mm. in length, and as no enlargement of the mesonotum is yet shown, confusion with *Aplopus* could easily occur, while the rudimentary rounded tegminal pads, 4.7 mm. in length and well formed, and elongate operculum might easily be taken as indices of maturity. Comparison with the adults here recorded, however, shows the present association to be correct beyond a doubt. The spines of the mesopleura, metapleura and limbs and tubercles of the mesosternum and metasternum are as in the adults, except for all being less prominent.

Diapherodes gigantea dominicae new subspecies (Pl. IV, fig. 22.)

Typical *gigantea* may be distinguished from this race in the female sex by its larger size, heavier but fewer spiniform tubercles of pronotum and mesonotum, much longer spines of marginal row on mesopleura and metapleura, and serrulate, almost spinose, margins of femora and tibiae, the former with medio-longitudinal ventral carina armed with long slender spines.

Type. — ♀; Dominica, British West Indies. February, 1927. (James Bond). [Academy of Natural Sciences of Philadelphia, Type no. 5539].

Size very large; form robust.

Occiput irregularly swollen and with two low blunt spines and several tubercles.

Pronotum with a pair of low blunt spines mesad on prozona, an even blunter pair at caudal margin and a few tubercles. Mesonotum broadening caudad in cephalic portion, surface of caudal portion armed with rather numerous irregularly scattered spines and tubercles. Metanotum and abdomen smooth. Tegmina very small, not reaching juncture of metanotum and median segment. Wings very much smaller, exposed, longitudinal vestigial pads. Mesopleura and metapleura each with a striking regular row of spines, the longest spine, however, not twice as long as its basal width.

Distal abdominal tergite similarly proportioned, but shorter than in *gigantea gigantea.* Operculum with distal portion broken off.

Limbs much less heavy than in *gigantea gigantea,* with femoral margins appearing smooth to the naked eye but actually very finely granulate or subserrulate, and tibial margins finely but sharply granulate. Mediolongitudinal carina of median and caudal femora armed with a row of stout spines.

General coloration green in life. Spines of body yellowish tipped with mars brown, those of mesopleura and metapleura wholly mars brown.

Length of body (exclusive of operculum), 121.8 mm.; greatest width of body, 16.8; length of mesonotum, 24.3, length of metanotum (with median segment), 18; length of median segment, 9.9; length of cephalic femur, 22; length of caudal femur, 26.

The type is unique.

EXPLANATION OF FIGURES

PLATE III

Fig. 1.—*Liguanea pediodromia* new genus and species. Dorsal view of female (*type*). Liguanea Plain, Jamaica. (× 2.)

Fig. 2.—*Liguanea pediodromia* new genus and species. Lateral view of cephalic femur of female (*type*). Liguanea Plain, Jamaica. (Greatly enlarged.)

Fig. 3.—*Lamponius dominicae* new species. Dorsal view of male (*type*). Laudet, Dominica. (Natural size.)

Fig. 4.—*Lamponius dominicae* new species. Lateral view of apex of abdomen of male (*type*). Laudet, Dominica. (Greatly enlarged.)

Fig. 5.—*Clonistria latebricola* new species. Lateral view of apex of abdomen of male (*type*). Rio Cobre, Jamaica. (Greatly enlarged.)

Fig. 6.—*Clonistria latebricola* new species. Dorsal view of apex of abdomen of male (*type*). Rio Cobre, Jamaica. (Greatly enlarged.)

Fig. 7.—*Clonistria bicoloripes* new species. Lateral view of apex of abdomen of male (*type*). Pleasant Hill House, Jamaica. (Greatly enlarged.)

Fig. 8.—*Clonistria bicoloripes* new species. Dorsal view of apex of abdomen of male (*type*). Pleasant Hill House, Jamaica. (Greatly enlarged.)

Fig. 9.—*Clonistria bicoloripes* new species. Lateral view of apex of abdomen of female (*allotype*). Near St. Helen's Gap, Jamaica. (Greatly enlarged.)

Fig. 10.—*Clonistria monticola* new species. Lateral view of apex of abdomen of male (*type*). Cinchona, Jamaica. (Greatly enlarged.)

Fig. 11.—*Clonistria monticola* new species. Dorsal view of apex of abdomen of male (*type*). Cinchona, Jamaica. (Greatly enlarged.)

Fig. 12.—*Clonistria annulipes* new species. Lateral view of apex of abdomen of male (*type*). Montego Bay, Jamaica. (Greatly enlarged.)

Fig. 13.—*Clonistria annulipes* new species. Dorsal view of apex of abdomen of male (*type*). Montego Bay, Jamaica. (Greatly enlarged.)

Fig. 14.—*Clonistria simplicitarsis* (Gray). Lateral view of apex of abdomen of male. Pleasant Hill House, Jamaica. (Greatly enlarged.)

Fig. 15.—*Clonistria simplicitarsis* (Gray). Dorsal view of apex of abdomen of male. Pleasant Hill House, Jamaica. (Greatly enlarged.)

PLATE IV

Fig. 16.—*Clonistria simplicitarsis* (Gray). Lateral view of apex of abdomen of female. Pleasant Hill House, Jamaica. (Greatly enlarged.)

Fig. 17.—*Clonistria simplicitarsis* (Gray). Lateral view of apex of caudal femur of female. Pleasant Hill House, Jamaica. (Greatly enlarged.)

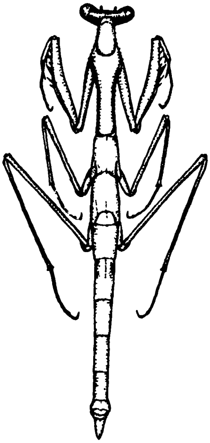
Fig. 18.—*Aploploides stenocephalum* new genus and species. Dorsal view of male (*type*). Pinar del Rio, Cuba. (Natural size.)

Fig. 19.—*Aploploides stenocephalum* new genus and species. Lateral view of apex of abdomen of male (*type*). Pinar del Rio, Cuba. (X 3½.)

Fig. 20.—*Aploploides stenocephalum* new genus and species. Dorsal view of female (*allotype*). South of Pinar del Rio, Cuba. (Natural size.)

Fig. 21.—*Aploploides stenocephalum* new genus and species. Lateral view of apex of abdomen of female (*allotype*). South of Pinar del Rio, Cuba. (X 3½.)

Fig. 22.—*Diapherodes gigantea dominicae* new subspecies. Dorsal view of female (*type*). Dominica. (Natural size.)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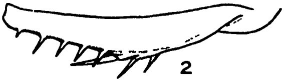
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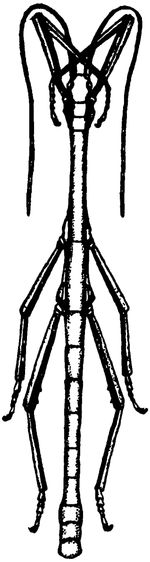
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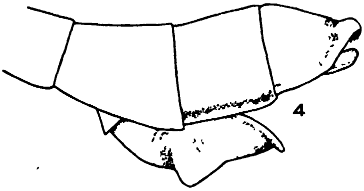
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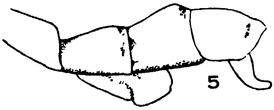
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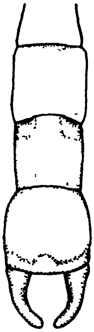
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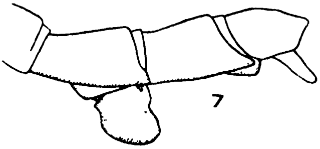
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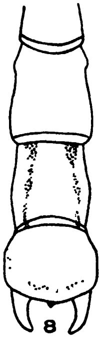
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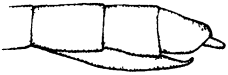
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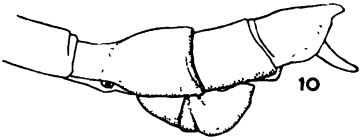
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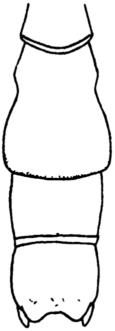
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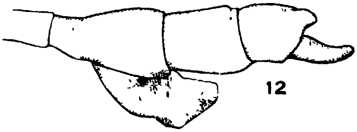
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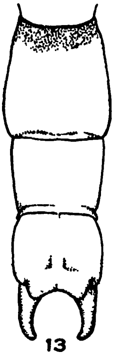
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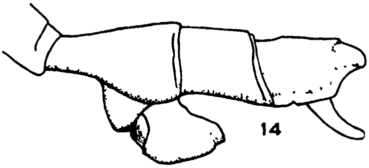
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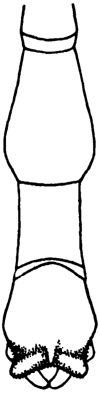
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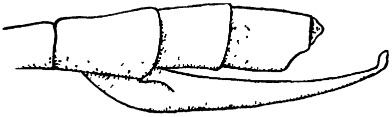
REHN and HEBARD—WEST INDIAN ORTHOPTERA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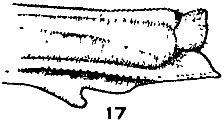
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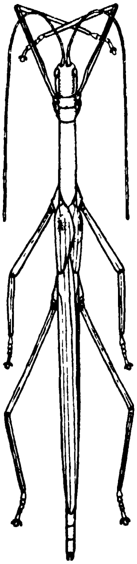
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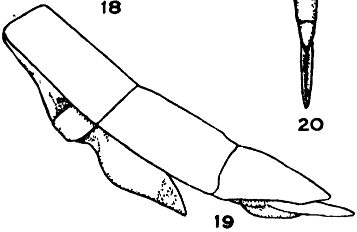
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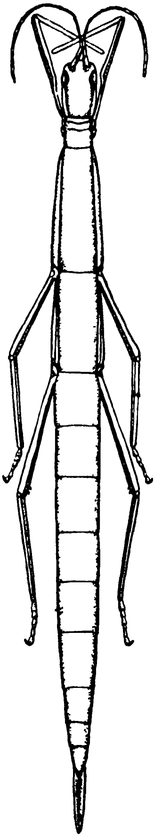
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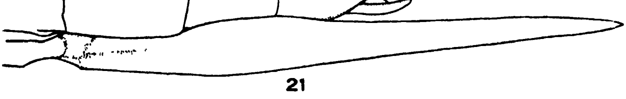
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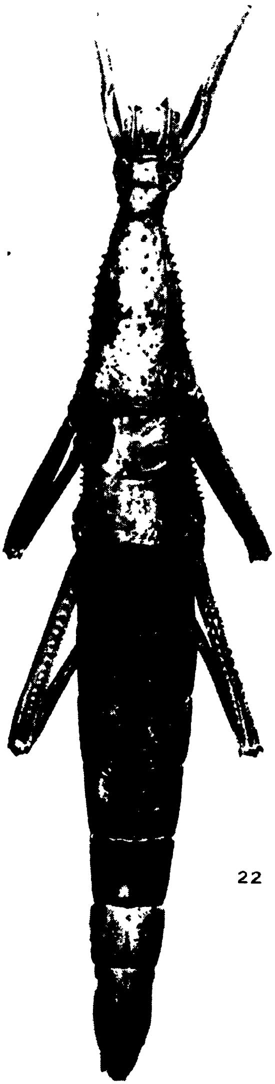
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REHN and HEBARD—WEST INDIAN ORTHOPTERA

STUDIES IN THE NYSSONINE WASPS

III.[1] A Revision of the Genus Harpactostigma Ashmead

(HYMENOPTERA: SPHECIDAE: GORYTINI)

BY V. S. L. PATE

It has been the usual practice to place all the species of Gorytini in either one unwieldy blanket genus *Gorytes* or in a few portmanteau genera such as *Hoplisus, Hoplisoides,* or *Gorytes.* During the past few years I have had an opportunity to examine the genotypes of practically all the genera proposed within this group and it has become quite evident that many diverse evolutionary lines have developed within this protean complex. Many of the names lightly dismissed in the past as mere figments of the taxonomic mind will have to be resuscitated for natural and discrete groups. One of these is the genus *Harpactostigma* which was proposed by Ashmead in his classification of the Sphecoid wasps for the reception of Spinola's Chilean species, *Hoplisus velutinus.* A critical study of our North American Gorytines has revealed there are a number of Nearctic species that must be assigned to Ashmead's genus. The present paper represents a tentative revision of these forms.

Acknowledgments.—The present study has been based largely upon the material in the collections of the Academy of Natural Sciences of Philadelphia. In addition, I am greatly indebted to Mr. Nathan Banks, Curator of Entomology at the Museum of Comparative Zoology at Cambridge for the privilege of studying the Herbst Collection of Chilean Hymenoptera as well as the other collections in his charge. Dr. Joseph Bequaert of the Harvard School of Tropical Medicine has very kindly loaned me material from his own collection; these specimens are now deposited in the Museum of Comparative Zoology. Professor

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[1] Part I, Trans. Amer. Ent. Soc., LXII, pp. 49-56, (1936); Part II, Bull. Brooklyn Ent. Soc., XXXI, pp. 198-200, (1937).

Myron H. Swenk of the Department of Entomology at the University of Nebraska has assisted me by sending for examination and study certain material of this genus and supplied me with the full data pertaining to other specimens in their collection. Finally, Dr. P. H. Timberlake of Riverside, California has very generously sent me valuable specimens from his own collection and thus enabled me to make this tentative study much more complete than it would otherwise have been.

HARPACTOSTIGMA Ashmead

Hoplisus [*nec* Lepeletier] Spinola (in Gay), Hist. fis. pol. Chile, Zool., VI, p. 337, (1851).

Harpactostigma Ashmead, Canad. Entom., XXXI, p. 299, (1899).—Pate, Mem. Amer. Ent. Soc., IX, p. 30, (1937).

GENOTYPE: *Hoplisus velutinus* Spinola, 1851 [=*Harpactostigma* (*Harpactostigma*) *velutinum* (Spinola)]. (Monobasic and by original designation.)

Ashmead when he erected the genus *Harpactostigma* incorrectly placed it in the Mellinini but it is indubitably a Gorytine. The slender elongate habitus and the nodose red first abdominal segment of the typical species cause it to superficially resemble *Mellinus* or the North American Gorytine *Hapalomellinus* but the structure of the mesopleura and the venation of the hind wing indicate that it is closely related to *Hoplisoides*.

In *Harpactostigma* the stigmatal grooves are present and well developed for their entire length, the first abdominal segment is nodose, petiolate, or subpetioliform, the males have seven abdominal tergites always clearly visible and the eighth sternite is emarginate to bifid apically, whereas in *Hoplisoides* the stigmatal grooves are absent or at most quite poorly developed for but a very short distance dorsally, the first abdominal segment is broadly sessile with the second or is coarctate as in *Psammaletes*, while the males usually have only six abdominal tergites clearly visible, the seventh generally being more or less retracted beneath the sixth and the last abdominal sternite terminates in a stout median spine.

Remarks.—Scarcely any of the characters which Ashmead employed in his definition of *Harpactostigma*— ". . . cubitus of the hind wings originating *before* the transverse median nervure;

submedian and median cells [of the fore wing] equal, the transverse median nervure [of the fore wing] interstitial with the basal nervure; stigma not well developed, the radius originating from its apex . . ." are applicable to all the species which I consider should be referred to it. Even in the genotype, the transverse median vein of the fore wing is barely interstitial with the basal nervure; in fact, in the majority of forms it is situated distinctly beyond the basal vein. The stigma is poorly developed in all the component species but in a great many of them the radial vein arises distinctly before the apex. In all the North American species of *Harpactostigma* studied, the cubitus and transverse median veins of the hind wing are interstitial; in the South American forms there is a tendency for the cubitus to arise slightly before the transverse median vein but the deviation is so slight that the two veins may be considered to be interstitial to all intents and purposes. Indeed, I believe it is not unlikely that Ashmead never had any actual specimens of the genotype before him but based his group entirely upon Spinola's figure and description, for I have examined the collections of the United States National Museum and have been unable to find any material of *Hoplisus velutinus* there.

Distribution.—So far as I am aware, *Harpactostigma* is a small but distinctive group confined entirely to the new world, the typical forms being restricted to South America. Although the North American species agree in all essential respects with *Harpactostigma velutinum,* nevertheless they differ in certain striking features and I believe that it may not be inappropriate to consider them at least subgenerically distinct.

Key to the Subgenera of Harpactostigma

First abdominal segment nodose; males with the fore femora simple, not swollen, inflated or laminate beneath, the last sternite narrow, attenuate, the apex retuse; thorax and abdomen black save for the red first abdominal segment, the abdominal tergites with one or more creamy white apical fasciae; (Neotropical forms)............*Harpactostigma* Ashmead

First abdominal segment petiolate or subpetioliform; males with the fore femora swollen, inflated, and usually laminate beneath and with the last sternite broader, the apex distinctly emarginate; thorax and abdomen differently coloured, the abdominal tergites without creamy white apical fasciae; (Nearctic forms)........................*Arcesilas* new subgenus

ARCESILAS[2] new subgenus

Hoplisus [*nec* Lepeletier] Patton, Canad. Entom., xi, p. 210, (1879).—Cresson [in part], Trans. Amer. Ent. Soc., xiv, Suppl., pp. 117 & 279, (1887).—Rohwer [in part], Connecticut Geol. & Nat. Hist. Surv. Bull. 22, p. 656, (1916).

Gorytes [in part] Handlirsch, Sitzber. Akad. Wissen. Wien, xcvii, p. 317, (1888).—Fox, Canad. Entom., xxiv, p. 149, (1892).—Fox, Proc. Acad. Nat. Sci. Phila., xlvii, p. 517, (1895).—Kohl, Ann. K. K. Naturhist. Hofmus. Wien, xi, p. 412, (1896).

Hoplisoides [in part] Ashmead, Canad. Entom., xxxi, pp. 323 & 328, (1899).—H. S. Smith, Univ. Nebraska Stud., viii, p. 343, (1908).—Mickel, Univ. Nebraska Stud., xvii, p. 352, (1918).

Hypomellinus [*nec* Ashmead] Baker, Invert. Pacif., i, p. 162, (1907).

Gorytes (*Hoplisoides*) [in part] Bradley, Trans. Amer. Ent. Soc., xlvi, p. 113, (1920).

Hoplisus (*Hoplisoides*) [in part] Rohwer, Proc. U. S. Nat. Mus., lix, p. 411, (1921).

GENOTYPE: *Gorytes mirandus* Fox, 1892 [=*Harpactostigma* (*Arcesilas*) *mirandum* (Fox)].

This subgenus is erected for those Gorytines in which the males have the fore femora swollen, inflated and usually laminate beneath. The species comprising it, particularly in the female sex, bear a superficial resemblance to those of the *Pseudoplisus* complex and to the Neotropical genus *Megistommum* but may be differentiated from those forms by the parallel, non-convergent inner margins of the compound eyes and also by the structure of the mesopleura in the same manner as I have indicated elsewhere that *Hoplisoides* is separable from *Gorytes*.[3] From *Hoplisoides* the species of *Arcesilas* may be distinguished by the well developed stigmatal grooves, the petioliform or subpetiolate first abdominal segment, and in the males by the emarginate eighth abdominal sternite.

Subgeneric Characters.—Form elongate; eyes with inner orbits parallel in both sexes, not converging strongly toward the clypeus which is transversely subrectangular, about twice as broad as long, transversely inflated discally and with a semi-translucent flange apically; antennae long and slender, reaching to or almost to postscutellum, situated on the front one-half the length of the clypeus above its dorsal margin, scape obcuneate, particularly in the males; temples broad and well developed above, tapering below.

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[2] After Arcesilas, king of Cyrene, a victor in the Pythian games of 462 B.C.

[3] Trans. Amer. Ent. Soc., lxii, pp. 51–52, (1936).

Thorax shining, highly polished and punctate or not; mesopleura with the omauli and sternauli present and well developed, with the lower portion of the episternal suture obsolete, the upper portion, which may be more or less obsolescent, vertical or almost so and curving backward into the horizontal episternaulus which may likewise be more or less obsolescent and which ends posteriorly in the meso-metapleural suture, the upper portion of the episternal suture and the episternaulus thus forming a more or less right-angled serial suture or furrow. Propodeum sculptured or not; stigmatal grooves present and well developed for their entire length; the dorsal basal trigonal area present and well defined.

Wings with the marginal cell of the fore wing narrow and elongate, the second submarginal cell receiving both recurrent veins beyond the middle, first discoidal cell narrow, elongate, almost as long as the three submarginal cells taken together. Hind wings with the cubitus and transverse median veins interstitial or nearly so.

Legs with the fore femora of the males more or less inflated and swollen, usually with a laminate expansion beneath, females without such lamina; hind coxae elongate, about twice as long as the middle pair; fore tarsi of females with a comb of long slender, flattened bristles, the last tarsal segment swollen and the pulvillus correspondingly larger in comparison with the four posterior ones; middle tibiae with two apical calcaria.

Abdomen shining, never very coarsely punctate, usually finely punctate at most; first segment elongate, petiolate, or subpetioliform; males with seven tergites clearly visible, the last without a pygidium, the sternites without any hair-brushes, the last sternite elongate rectangular, relatively broader than in *Harpactostigma* in the restricted sense and emarginate to bifid apically; females with a distinct, broad, subtrigonal pygidial area, broadly rounded apically.

Distribution.—The subgenus *Arcesilas* is apparently precinctive and confined to the Nearctic region, although it is quite possible that it may eventually be found in northern Mexico. On the basis of the data now available, which in some cases are admittedly rather inadequate, the various species comprising *Arcesilas* seem to be limited to definite geographic areas of the United States. Thus *gracile* is rather generally distributed throughout the Austroriparian and Carolinian zones of the eastern and middle western states east of the 100th meridian; *arapaho* inhabits the plains area of eastern Colorado; *rutilum* the upper Rio Grande valley; *mirandum* the Great Basin area of Nevada and neighboring states; *laminiferum* the Columbian plateau of central Washington, while *femoratum* is to be found in the Mojave Desert and adjacent areas of central southern California. However, this thesis of the distribution of the divers species of *Arcesilas* is purely tentative and may quite probably be subject to change or modification upon the acquisition of further material and more extensive series of the various forms.

Component Species.—The subgenus *Arcesilas* contains at present six species[4] divisible into at least two distinct groups. Of these, the Femoratum Group, which contains only the typical species (*femoratum*), is without question the more generalized of the two. It is characterized by the fore femora of both sexes being similar, simply swollen or inflated and not provided with a laminate expansion beneath. The first abdominal segment, moreover, is at most only subpetioliform. The Mirandum Group, which contains five species (*gracile, arapaho, rutilum, mirandum* and *laminiferum*) representing probably two subgental evolutionary trends, is the more highly developed complex of the subgenus. The males of this group have the fore femora furnished with a distinct lamellate expansion whereas the fore femora of the females are simple and not thus armed. Furthermore, the first abdominal segment of the species comprising the Mirandum Group tends to be more strongly petiolate than in the Femoratum Group.

Key to the Species of Arcesilas[4]

1. Males 2
   Females 6
2. Fore femora swollen but without a lamina beneath; propodeum shining, highly polished and impunctate and without sculpture except slightly so posteriorly in the valvular region; dorsal trigonal area coarsely striate throughout; (California) ....*femoratum* (Bradley)
   Fore femora with an expanded lamina beneath 3
3. Propodeum coarsely punctate and transversely cicatrose posteriorly and laterally; wings fulvous, somewhat infuscated apically (Washington). *laminiferum* (Fox)
   Propodeum not transversely cicatrose posteriorly but shining, highly polished and impunctate, or at most with scattered punctures 4

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[4] Exclusive of *Hypomellinus flavicornis* Baker. *Cf.* discussion of this species on a following page.

4. **Trigonal enclosure of propodeum with oblique parallel striae basally on each side, apically with transverse striae; wings hyaline with slight infumation in marginal cell and costal region; (Nevada).**
mirandum **(Fox)**

Trigonal enclosure of propodeum with oblique parallel striae apically, wings infumated or coloured throughout 5

5. **Wings uniformily fuscoviolaceous; mesonotum and mesopleura impunctate or very weakly so; black and yellow forms; (eastern and middle western forms) ....*gracile* (Patton)**

Wings light fuliginous, costa and stigma fulvous; mesonotum and mesopleura with scattered punctures; red and yellow forms; (Texas).
rutilum new species

6. Propodeum coarsely punctate and transversely cicatrose posteriorly and laterally; wings fulvous, somewhat infuscated apically; (Washington) ....*laminiferum* (Fox)

Propodeum shining, highly polished and impunctate, not transversely cicatrose posteriorly except slightly so medio-posteriorly in valvular region 7

7. Wings fuscoviolaceous; mesonotum at most weakly and inconspicuously punctate; (eastern and middle western forms) ....*gracile* (Patton)

Wings in large part hyaline with a very light fulvous tint, marginal and second and third submarginal cells of fore wing to apex infuscated; mesonotum and mesopleura with distinct scattered puncturation 8

8. Trigonal enclosure of propodeum coarsely and longitudinally striate throughout; head largely black with yellow markings; (California).
femoratum (Bradley)

Trigonal enclosure of propodeum striate basally only; head largely yellow with black or red markings; (Colorado) ..*arapaho* new species

Harpactostigma (Arcesilas) femoratum (Bradley)

Gorytes (*Hoplisoides*) *femoratus* Bradley, Trans. Amer. Ent. Soc., XLVI, p. 119, (1920). [♂.]

Type.—♂; Claremont, Los Angeles County, California; (C. F. Baker); [Cornell University, Type no. 144].

This is a somewhat anomalous species of *Arcesilas* in that the fore femora of the males are simply swollen or inflated and not provided with a lamina beneath as are the remainder of its congeners. The first abdominal segment, moreover, is at most only subpetioliform. However, the structure of the mesopleura, the propodeum, and the last abdominal sternite of the male indicate that it is undoubtedly a member of this genus and subgenus. It it without question the most generalized representative of *Arcesilas*.

Hitherto the species has been known only from the unique male. Through the kindness of Dr. P. H. Timberlake of Riverside, California I have had an opportunity to examine a short series of specimens of this species. In it is a female which is indubitably the opposite sex of *femoratum* and which is described herewith.

Allotype.— ♀ ; Riverside, Riverside county, California, May 7, 1935, (P. H. Timberlake), [Timberlake].

Female.—10 mm. long. Black; the following lemon-yellow: mandibles except apices which are red, palpi, labrum, clypeus, lower third of front, inner orbits with a broad stripe almost to vertex, lower half of posterior orbits, antennae with scape entirely, pedicel and first four flagellar articles anteriorly, the remainder fulvescent (pedicel and all flagellar segments fuscous posteriorly), pronotum, tubercles, mesonotum laterally on each side with an elongate longitudinal stripe terminating in the laminae, tegulae, scutellum and postscutellum; mesopleura with the anterior and upper two-thirds, propodeum with a large ovate spot on each posterior lateral angle extending from the stigmatal grooves and the lateral margins of the dorsal trigonal area almost to the median caudal furrow; abdomen with the first five tergites and sternites with broad apical fusciae, those of the first two tergites deeply emarginate anteriorly; fore legs entirely, middle and hind legs likewise except the following which are black: bases of coxae, trochanters posteriorly, proximal half of posterior surface of middle and all of posterior face of hind femora, inner posterior face of hind tibiae. Tarsi rufescent apically. Spines on posterior margin of hind tibiae black. Last abdominal segment flavoferrugineous. Wings clear hyaline, with a tawny tint anteriorly and basally; fore wing with the marginal cell and the second and third submarginal cells to apex of wing infumated; hind wing infumated apically; costa, subcosta, stigma and other veins basally, fulvous; remainder light fuscous.

Head and thorax clothed with fine puberulent pubescence which is aeneous and particularly noticeable on face, vertex, mesonotum and dorsal surface of propodeum; abdomen with fine, inconspicuous, puberulent argenteous pile especially on tergites.

Head shining to semiopaque, face, vertex and upper half of clypeus with a very fine and dense basic puncturation upon which is superposed a series of somewhat larger, more distinct, scattered punctures, distal half of clypeus nitidous and practically impunctate; eyes with the inner orbits parallel; clypeus transverse, about twice as broad as long, transversely inflated discally and with a transverse row of setigerous punctures medially, apical margin truncate and provided with a narrow, semitranslucent flange; antennae elongate, reaching to scutellum or postscutellum, first flagellar article longer than the scape; ocellocular line slightly longer than postocellar.

Thorax shining, highly polished; mesonotum with a rather sparse, fine basic acupuncturation upon which is superposed a series of coarser, larger, very scattered punctures; mesonotum with the notauli and parapsidal furrows weakly indicated on anterior fourth; sutures between mesonotum and scutellum and scutellum and postscutellum strongly foveolate; scutellum and postscutellum with a few irregularly disposed punctures; metapleura and lateral faces of the propodeum to the stigmatal grooves shining, highly polished and impunctate, the former with several subparallel oblique rugulae on lower half; stigmatal grooves weakly foveolate above; dorsal face of propodeum with trigonal area strongly and coarsely striate throughout, the lateral margins foveolate; the posterior face of propodeum with a weak median longitudinal sulcus, on each side of which in the valvular region the surface is obliquely rugulose.

Fore tarsi with a comb of moderately long, somewhat flattened bristles; fore coxae stout but elongate, subequal in length to the long slender hind coxae which are about twice the length of the middle pair and which extend caudad for about one-half the length of the first abdominal segment; femora fusiform; tibiae long, slender, terete, slightly widened distally, middle and hind pair with two calcaria, the former spinose on distal half, the latter spinose on posterior margins; tarsi long and slender, the last segment and pulvillus of the fore tarsi swollen and much larger than the four posterior ones, middle and hind tarsi spinose, particularly on the dorsal surface of the metatarsi.

Abdomen shining, highly polished; first segment subpetiolate; tergites, particularly the third, fourth and fifth, with moderately fine, scattered punctures; sternites with closer and somewhat coarser punctures; pygidium broadly trigonal, the apex rounded, disc shining to semiopaque, with moderately close, irregularly arranged, coarse punctures making the surface appear longitudinally substriate.

Distribution.—This species is apparently restricted to the more xeric areas of southern California.

Specimens examined.—CALIFORNIA: 1 ♂; Claremont, Los Angeles county, (C. F. Baker), [*type*, Cornell University]. 1 ♀; Riverside, Riverside county, May 7, 1935, (P. H. Timberlake), [Timberlake]. 2 ♂; about 8 miles south of Victorville, Mojave Desert, San Bernardino county, May 22, 1932, (P. H. Timberlake; on *Larrea divaricata*), [Timberlake].

Harpactostigma (Arcesilas) gracile (Patton)

Hoplisus gracilis Patton, Canad. Entom., XI, p. 210, (1879); [♀].—Cresson, Trans. Amer. Ent. Soc., XIV, Suppl., p. 279, (1887).—Rohwer, Connecticut Geol. & Nat. Hist. Surv. Bull. 22, p. 657, (1916).

Gorytes gracilis Handlirsch, Sitzber. Akad. Wissen. Wien, XCVII, p. 456, (1888); [♂, ♀].—Fox, Proc. Acad. Nat. Sci. Phila., XLVII, p. 532, (1895).

Hoplisoides gracilis Ashmead, Canad. Entom., XXXI, p. 328, (1899).
Hoplisoides laminiferus [*nec* Fox] H. S. Smith, Univ. Nebraska Stud., VIII, p. 345, (1908); [♂].—Mickel, Univ. Nebraska Stud., XVII, p. 355, (1918); [♂].

Type.—Patton originally described this species from a unique female taken in July at Southington, Hartford county in Connecticut. So far as I am aware, the type is lost or destroyed.

Remarks.—For the most part this species has been unidentified or mislabelled in the majority of collections despite the fact that Patton's description is astonishingly full and adequate. Handlirsch in 1888 gave a description of the male sex based upon a specimen taken at Savannah, Georgia, but unfortunately he omitted mentioning the characteristic fore femoral lamina.

The present species is the only known form in the genus with deep fuliginous to fusco-violaceous wings. In the males the fore femoral lamina is obliquely and longitudinally excavate beneath, the fossa extending almost to the knees much as in *laminiferum* and *rutilum,* but unlike those forms is glabrous rather than pubescent beneath.

Variation.—In the series of specimens before me, the trigonal enclosure of the propodeum, which is usually striate or grooved only on the basal half, occasionally has the striae tending to extend almost to the apex or there may be a faint suggestion of transverse striae apically as in *mirandum.* The material from Georgia exhibits a tendency toward erythrization; the mesonotum, the basal half of the first two abdominal segments, and the legs are distinctly rufescent or even rufous. This condition, however, is a rather common phenomenon found in many diverse species of aculeates whose range extends into the southern and western states. Banks called attention to it some years ago in a paper on the Pompilids.[5]

Distribution.—This form has the widest known range of any species of the genus. While apparently nowhere common, it is generally distributed throughout the east and middle west, east of the 100th meridian, in the Austroriparian and Carolinian zones. The specimens reported from Nebraska by Smith and Mickel as *Hoplisoides laminiferus* (Fox) are this species rather than Fox's transmontane Washington form.

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[5] Proc. Ent. Soc. Washington, XIII, p. 238, (1911).

The following is a list of such distributional data pertaining to this species of which I am aware. Material which I have not seen is marked by an asterisk (*) or otherwise indicated.

CONNECTICUT: *1 ♀, Southington, Hartford County, July, (W. H. Patton); [*type*, lost].

NEW JERSEY: 1 ♀, Lakehurst, Ocean County, July 21, 1917, (F. M. Schott); [Museum of Comparative Zoology]. 2 ♂, 1 ♀, Riverton, Burlington County, June 6 and 22, (H. L. Viereck), [A.N.S.P.].

VIRGINIA: 1 ♀, 1 ♂, Falls Church, Fairfax County, April 19 and July 4, (Nathan Banks), [M.C.Z.].

GEORGIA: 1 ♂, Spring Creek, Decatur County, May 18-21, 1921, (J. C. Bradley), [Cornell University]; 1 ♀, 1 ♂, Tifton, Tift County, May 20, 1896, (S. N. Dunning), [Academy of Natural Sciences of Philadelphia]; *1 ♂, Savannah, Chatham County, (Winthem), [Natural History Museum, Vienna].

MICHIGAN: 1 ♀, Midland County, July 6, 1932, (R. R. Driesbach).

SOUTH DAKOTA: 1 ♂, Hot Springs, Fall River County, July 11, 1924, [M.C.Z.].

NEBRASKA:[6] 2 ♂, West Point, Cuming County, June 25, (P. R. Jones); 3 ♂, Rulo, Richardson County, July 1 and 3, 1915, (E. M. Partridge; on *Melilotus alba*); 1 ♂, South Bend, Cass County, July 2, 1915, (E. G. Anderson); 1 ♂, Louisville, Cass County, July 5, 1915, (E. G. Anderson); 1 ♂, Halsey, Thomas County, August 9, 1912, (J. T. Zimmer); [all University of Nebraska].

Harpactostigma (Arcesilas) arapaho[7] new species

This interesting species occupies a position somewhat intermediate between *gracile* and the following new form *rutilum* but is readily separable from both by the markedly different coloured wings. It agrees with the former in possessing the same type of sculpturing on the basal trigonal propodeal area but differs from it by having the mesonotum and mesopleura more heavily and coarsely punctate. Superficially, the present species somewhat resembles *rutilum*, but in addition to the differently patterned wings, *arapaho* may be distinguished from that form by the fact that the basal trigonal propodeal area is not as fully nor as strongly striate as that of the following species.

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[6] I have not examined all this material from Nebraska. Prof. Myron H. Swenk at my request kindly sent me part of the series to confirm my suspicions that these specimens which Mickel and Smith reported as *Hoplisoides laminiferum* (Fox) were in reality Patton's species. I am reasonably confident that all the Nebraska records given above pertain to this species.

[7] After the Arapaho Indians.

Type.—♀; Roggen, Weld County, Colorado, July 17, 1930, (H. G. Rodeck), [Museum of Comparative Zoology].

Female.—11 mm. long. Head lemon-yellow, occiput and a subquadrate spot broadly and roundly excised anteriorly in ocellar area black; antennae lemon-yellow, flagellum fulvescent apically; tips of mandibles rufous; thorax black, the following lemon-yellow: pronotum dorsally and tubercles, mesonotum laterally, scutellum and postscutellum, tegulae and axillary sclerites with a spot discally, anterior two-thirds of mesopleura, posterior angles of propodeum with a large ovate spot extending from stigmatal grooves almost to median longitudinal sulcus of posterior face and from basal trigonal dorsal area almost to valvular area; mesonotum and tegulae and axillary sclerites rufous. Abdomen black, the following rufous; anterior half of first and second tergites, first sternite wholly, basal half of second sternite, last tergite and sternite wholly; the following lemon-yellow: apical half of first and second tergites, third, fourth and fifth tergites with a very broad apical fascia. Legs lemon-yellow, femora narrowly above and tibiae apically beneath, middle and hind coxae beneath, rufous; tarsi fulvescent apically. Wings hyaline with a very light tawny tint; fore wings with marginal and second and third submarginal cells to apex infuscated; hind wings infumated apically; veins fulvous. Head, thorax and abdomen clothed with a fine, appressed, inconspicuous pale pubescence.

Head shining to semiopaque; face, vertex and upper half of clypeus with very fine acupuncturation upon which is superposed a heavier, coarser series of scattered punctures, distal half of clypeus shining, highly polished and practically impunctate; eyes with inner orbits parallel; clypeus transverse, about twice as broad as long, transversely inflated discally and with a transverse row of setigerous punctures medially, apical margin truncate and provided with a narrow semitranslucent flange; antennae elongate, reaching to scutellum or postscutellum, first flagellar article longer than the scape; ocellocular and postocellar lines subequal.

Thorax shining, highly polished; mesonotum and mesopleura with moderately coarse, scattered punctures, the former with notauli and parapsidal furrows weakly indicated on anterior fourth; sutures between mesonotum and scutellum and scutellum and postscutellum strongly foveolate; scutellum and postscutellum with a few irregularly scattered punctures; metapleura and lateral faces of propodeum to stigmatal grooves shining, highly polished and impunctate; stigmatal grooves weakly foveolate above; dorsal face of propodeum with basal trigonal area weakly striate basally and with a median longtudinal sulcus continuing onto posterior face, the grooves bounding the trigonal area and the median longitudinal sulcus of posterior face weakly foveolate; posterior face of propodeum transversely rugulose for a short distance on each side of median sulcus from just below dorsal trigonal area almost to valvular region.

Fore tarsi with a comb of moderately long, somewhat flattened bristles; fore coxae stout but elongate, subequal in length to the long slender hind coxae which are about twice the length of the middle pair and which extend caudad for about one-half the length of the first abdominal segment; femora fusiform; tibiae long, slender, terete, slightly widened distally, middle and hind pair with two calcaria, the former spinose on distal half, the latter spinose on posterior margins; tarsi long and slender, the last segment and pulvillus of the fore tarsi swollen and much larger than the four posterior ones, middle and hind tarsi spinose, particularly on the dorsal surface of the metatarsi.

Abdomen shining, highly polished; first segment subpetiolate; tergites with moderately fine, scattered punctures; sternites with closer, somewhat coarser punctures; pygidium broadly trigonal, the apex broadly rounded; the surface with scattered, coarse, well separated punctures.

Male.—Unknown.

Paratype.—♀; Crowley, Crowley County, Colorado, August 4, 1933, (H. Jones), [Museum of Comparative Zoology].

The paratypic specimen from Crowley agrees very well with the type except that the stigmatal grooves are not quite so pronounced and the black colouration is replaced entirely by red. The yellow markings, moreover, are more extensive than in the type, the mesopleura being wholly yellow, while the metapleura has the dorsal half of this colour.

The type and paratype are the only specimens as yet known of this distinctive species. The acquisition of additional material, particularly of the males, is awaited with interest.

Harpactostigma (Arcesilas) rutilum[8] new species

The shining red and yellow habitus of this species will immediately differentiate it from the other known forms of *Arcesilas*. Structurally, it is somewhat intermediate between *mirandum* and *gracile*, being separable from both by the shape and conformation of the fore femoral lamina and from the former by the differentiately striate basal trigonal propodeal area, while it may be distinguished from the latter by the coarsely punctate mesonotum and mesopleura.

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[8] From *rutilus*, yellowish-red, in allusion to the general habitus of this species.

Type.—♂; El Paso, El Paso County, Texas, alt. 3,650 to 4,000 feet, July 11, 1907, (Rehn & Hebard), [Academy of Natural Sciences of Philadelphia, Type no. 4187].

Male.—11 mm. long. Reddish-yellow; the following lemon-yellow: mandibles except for the apices which are red, palpi, labrum, clypeus, face, a broad stripe along posterior orbits, neck, pronotum and tubercles, scutellum, postscutellum, tarsi, posterior half of first abdominal segment, practically all of the remaining tergites and sternites. Ocelli and scutellum laterally dark brunneous. Wings light fuliginous save for costal and marginal cells and the stigma which are fulvous; veins fuscous except for the fulvous costa and stigma. Body, particularly the abdomen clothed with a very fine, inconspicuous puberulent pubescence.

Head shining to semiopaque; vertex, disc of face and clypeus with a very fine basic acupuncturation upon which is superposed a series of coarser scattered punctures, supra-clypeal region and temples impunctate; eyes parallel; clypeus transverse, about twice as broad as long, transversely inflated, apical margin truncate and provided with a narrow semitranslucent flange; antennae long, reaching to or beyond the tegulae, situated toward middle of face about one-fourth the length of eyes above their lower margins, scape short, about one-half the length of eyes, obcuneate, flagellum with the eighth segment broadened and excavate beneath, the ninth and tenth articles distincly shorter and narrower than the eighth and slightly excavate beneath, the terminal segment attenuate, longer and narrower than the penult article.

Thorax shining, highly polished; the mesonotum and pleura with a few scattered punctures, the former with the notauli and parapsidal furrows weakly indicated on anterior half, the latter with the omauli and sternauli well developed but not foveolate; scutellum and postscutellum with microscopic well separated acupuncturation, the sutures between mesonotum and scutellum and scutellum and postscutellum foveolate. Propodeum shining, highly polished; stigmatal grooves well developed for their entire length, weakly foveolate above; basal trigonal area delimited by a strongly impressed and foveolate groove, the area radiately grooved; posterior face of propodeum with a median longitudinal sulcus and transversely rugulose ventrally in the valvular region. Fore femora with a curved laminate expansion beneath, the lower surface of which is broadly and longitudinally fossate and clothed with fine erect silvery puberulent hairs.

Abdomen shining, highly polished; the first two tergites with a few fine scattered punctures, the remaining tergites and sternites with a somewhat heavier and closer but quite well separated series of punctures; last sternite distinctly emarginate apically.

Female. Unknown.

The species is known only from the unique type. The acquisition of further material, particularly of the female sex, is awaited with much interest.

Harpactostigma (Arcesilas) mirandum (Fox)

Gorytes mirandus Fox, Canad. Entom., xxiv, p. 172, (1892); [♂].—Fox, Proc. Acad. Nat. Sci. Phila., xlvii, p. 532, (1895); [♂].—Handlirsch, Sitzber. Akad. Wissen. Wien, civ, p. 914, (1895); [♂].—Cresson, Mem. Amer. Ent. Soc., v, p. 47, (1928); [♂].

Hoplisoides mirandas [sic] Ashmead, Canad. Entom., xxxi, p. 328, (1899).

Gorytes (*Hoplisoides*) *mirandus* Bradley, Trans. Amer. Ent. Soc., xlvi, p. 120, (1920); [♂].

Lectotype.— ♂; Nev[ada]; (no other data); [Academy of Natural Sciences of Philadelphia, Type no. 4804].

This, the typical species of *Arcesilas*, occupies a position somewhat intermediate between *rutilum* and *laminiferum*. It is readily separable from all the other known members of the complex by the sculpture of the basal trigonal area of the propodeum as set forth in the key to species on a preceding page. The female sex of *mirandum* is still unknown.

Remarks.—The fore femoral lamina of *mirandum* is smaller than in *rutilum* and *laminiferum*. Like the former it has the femoral fossa pubescent, but the fossa in *mirandum* is basal and transverse whereas in *rutilum* and *laminiferum* it is longitudinal and extends almost to the knee. The present species and *femoratum* are the only forms of this group so far known that have the wings hyaline in large part.

Distribution.—This form is apparently restricted to the Great Basin area of the west, although more material is greatly to be desired to substantiate this tentative thesis. No material other than the type series of four males has been taken or reported upon since Fox described this species.

Specimens examined.—Nevada: 4 ♂, (no other data); [A.N.S.P.].

Harpactostigma (Arcesilas) laminiferum (Fox)

Gorytes laminiferus Fox, Proc. Acad. Nat. Sci. Phila., xlvii, p. 532, fig. 2, (1895); [♂].—Cresson, Mem. Amer. Ent. Soc., v, p. 47, (1928); [♂].

Hoplisoides laminiferus Ashmead, Canad. Entom., xxxi, p. 328, (1899); [♂].

Gorytes (*Hoplisoides*) *laminiferus* Bradley, Trans. Amer. Ent. Soc., xlvi, p. 120, (1920); [♂].

Type.— ♂; W[ashington] T[erritory]; (no other data); [Academy of Natural Sciences of Philadelphia, Type no. 4805].

This species is readily differentiated from the other known forms of *Arcesilas* by the light fulvous wings, the coarsely punctate thorax, and the strong and transversely cicatrose posterior surface of the propodeum. It is the most highly developed member of the *Arcesilas* complex and in the structure of the thorax and propodeum superficially resembles the Chilean *H.* (*Harpactostigma*) *velutinum* (Spinola).

The present species has been known hitherto only from the type, a unique male, but in the additional material now before me there is a female which is indubitably the opposite sex of Fox's species and which, since specimens of this sex of *Arcesilas* are relatively rare, is described herewith.

Allotype.— ♀; 2 miles east of junction of Agency and Simcoe Creeks, Yakima county, Washington, July 3, 1909; [Academy of Natural Sciences of Philadelphia].

Female.—12.5 mm. long. Black; the following lemon-yellow: mandibles medially, labrum, palpi, a narrow stripe along inner and posterior orbits, pronotum dorsally, tubercles, mesopleura with a small spot behind the tubercles, scutellum and postscutellum save for the anterior foveolate grooves, propodeum laterally on each side of the dorsal surface with a small circular spot and laterally on posterior surface with a larger obcuneate spot, posterior half of the first two abdominal tergites, almost all of the third, fourth and fifth tergites entirely, posterior third of the second sternite and all of the third and fourth sternites, fore coxae and trochanters anteriorly, fore tibiae beneath, middle and hind femora apically, middle tibiae and middle and hind tarsi. The following fulvous: clypeus, antennae, tegulae and axillary sclerites, mesonotal laminae, fore femora beneath, fore tibiae externally, fore tarsi, middle and hind tibiae apically, narrow apical margins of the third, fourth and fifth abdominal tergites, last tergite and last two sternites. Wings fulvous, imfumated slightly toward apex; veins fulvous. Head and mesonotum with fine decumbent, inconspicuous aeneous pubescence, remainder of thorax and abdomen similarly clothed with whitish pubescence.

Head semiopaque, with a close microscopic acupuncturation upon which is superposed a series of coarser, irregularly scattered punctures; inner orbits parallel; clypeus transverse, about twice as broad as long, transversely inflated and with a transverse row of stiff setae medially, apical half shining, impunctate, apical and lateral margins with a narrow semitranslucent flange; antennae elongate, reaching to beyond tegulae, inserted on front a bit above dorsal margin of clypeus, scape narrow, elongate, slightly widened toward apex, about one-half the length of eyes, first flagellar article subequal in length to scape.

Thorax shining to semiopaque; mesonotum and mesopleura with rather coarse puncturation for the group, the mesonotum with the notauli and parapsidal furrows weakly impressed on anterior third; mesopleura with the omauli and sternauli well developed, the serial episternal-episternaulal suture well defined, the upper posterior dorsal mesopleural plate thus delimited longitudinally cicatrose; metapleura shining, highly polished, impunctate, longitudinally cicatrose above; scutellum and postscutellum with a few scattered punctures, the sutures between the mesonotum and scutellum and scutellum and postscutellum strongly foveolate. Propodeum coarsely punctate, transversely rugulose to cicatrose posteriorly; stigmatal grooves well developed for their entire length; dorsal basal trigonal area radiately grooved, the margins defined by a strongly impressed foveolate groove.

Legs with the fore coxae stout but elongate, subequal in length to the long slender hind coxae which are twice the length of the middle pair and which extend posteriorly for at least half the length of the first abdominal segment; fore femora slightly swollen but not laminate beneath; middle and hind femora fusiform; tibiae long slender, terete, slightly widened distally, middle and hind pair with two apical calcaria, the former spinose on distal half, the latter spinose on posterior margins; tarsi long and slender, the last segment and pulvillus of fore tarsi swollen and much larger than the four posterior ones, fore tarsi with a comb of long flattened bristles, middle and hind tarsi spinose, particularly on the dorsal surface of the metatarsi.

Abdomen shining, highly polished, with a few fine scattered punctures; first abdominal segment subpetiolate, about twice as long as wide at apex; pygidium broadly subtrigonal, the apex broadly rounded, the surface longitudinally striatopunctate.

Distribution.—Upon the basis of the present data, this form is apparently confined to south central Washington. Smith[9] and Mickel[10] incorrectly reported it from Nebraska but the material they had before them has proved to be Patton's long lost form, *Hoplisus gracilis* [=*Harpactostigma* (*Arcesilas*) *gracile* (Patton)], as I have pointed out in the discussion of that species on a preceding page.

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[9] Univ. Nebraska Stud., VIII, p. 345, (1908).

[10] Univ. Nebraska Stud., XVII, p. 355, (1918).

Specimens examined.—3; 2 ♂; 1 ♀.

WASHINGTON: 1 ♂, W[ashington] T[erritory], (no other data), [*type*, A.N.S.P.]; 1 ♀, 2 miles east of junction of Agency and Simcoe Creeks, July 3, 1909, [A.N.S.P.]; 1 ♂, Nelson's, Yakima River, W[ashington] T[erritory], Kittitas County, July 4, 1882, (Henshaw), [M.C.Z.].

Harpactostigma (Arcesilas) flavicorne (Baker)

Hypomellinus flavicornis Baker, Invert. Pacif., I, p. 162, (1907). [♂; Claremont, California.]

Type.—♂; Claremont, Los Angeles county, California; (C. F. Baker).[11]

Baker described this species from a unique male, placing it in Ashmead's genus *Hypomellinus* which as I have shown elsewhere[12] is a synonym of *Lestiphorus* Lepeletier. Nevertheless I have little doubt that *flavicorne* is referable to this genus and subgenus rather than to *Lestiphorus* inasmuch as Baker states in the original description that the ". . . anterior femora [are] gradually broadened below into a broad flattened inflation . . ." and the ". . . abdomen is petioliform, very weakly and sparsely punctured. . ." These two characters alone are sufficiently distinctive to indicate that *flavicorne* is practically without shadow of doubt a member of *Arcesilas,* for in *Lestiphorus* the first abdominal segment is strongly coarctate and the fore femora of the male are not provided with a laminate expansion beneath.

Baker's description is otherwise rather unsatisfactory and somewhat contradictory and since I have been unable up to the present juncture to examine the type, I am unable to place his species with any certitude. It may be that *flavicorne* is a synonym of *laminiferum* or possibly a discrete species somewhat intermediate between that form and the eastern species *gracile.* Bradley's species *femoratum* was described from Claremont from material taken by Baker but the wings are said to be evenly fuscous in *flavicorne* whereas in *femoratum* they are largely hyaline with a tawny tint and infuscated only toward the apex. Moreover, in *femoratum* the fore femora of the male is merely inflated; it lacks the " broad flattened inflation " which I assume Baker uses for the femoral lamina that is so characteristic for most of the males of *Arcesilas.*

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[11] The type is probably in the collection of Pomona College.

[12] Trans. Amer. Ent. Soc., LXII, p. 50, (1936).

Subgenus **HARPACTOSTIGMA** Ashmead

Hoplisus [*nec* Lepeletier] Spinola, (in Gay) Hist. fis. pol. Chile, Zool., VI, p. 337, (1851).—Reed, An. Univ. Chile, LXXXV, p. 638, (1894).
Gorytes [in part] Handlirsch, Sitzber. Akad. Wissen. Wien, XCVII, p. 316, (1888).—Brèthes, An. Mus. Nac. Hist. Nat. Buenos Aires, XXIV, p. 130, (1913).—Jaffuel & Pirión, Rev. Chileña Hist. Nat., XXX, p. 378, (1926).
Gorytes (*Hoplisus*) Brèthes, An. Mus. Nac. Hist. Nat. Buenos Aires, XVII, p. 461, (1909).
Harpactostigma Ashmead, Canad. Entom., XXXI, p. 299, (1899).—Pate, Mem. Amer. Ent. Soc., IX, p. 30, (1937).

GENOTYPE: *Hoplisus velutinus* Spinola, 1851 [= *Harpactostigma* (*Harpactostigma*) *velutinum* (Spinola)].

In a subgeneric sense the name *Harpactostigma* is restricted to that group of species containing the genotype, *Hoplisus velutinus* Spinola, and agreeing with it in having the first abdominal segment nodose, and in the male sex with the fore femora simple, not swollen, inflated, nor laminate beneath, and with the last abdominal sternite narrow, elongate, attenuate with the apex retuse. It may be readily separated from its Nearctic relative *Arcesilas* by the characters given in the key to subgenera on a foregoing page.

Remarks.—Although nomenclatorially the typical group of this genus, from a taxonomic standpoint *Harpactostigma* in the restricted sense is obviously a more highly specialized complex than its Nearctic relative *Arcesilas.* Both groups have clearly been derived from a common ancestor of the *Hoplisoides* type but the members of the typical subgenus have evolved further from this ancestral stock in certain respects than have those species comprising *Arcesilas.*

Distribution.—The present group is restricted entirely to the Chilean and adjacent Patagonian regions of South America. The typical species, *velutinum,* is confined largely to Chile, while the other form, *unicinctum,* is found in the Cisandean piedmont of the Argentine. The complex is apparently a remnant of that ancient, isolated Chilean fauna of which there are so many striking examples among the insects.

Species of Subgenus.—As understood here, the subgenus *Harpactostigma* contains but two species, *H. velutinum* (Spinola) and *H. unicinctum* (Brèthes). The latter bears a superficial resemblance to the former, but may be readily distinguished from the genotype by the features given in the following key to species.

Key to the Species of the Subgenus Harpactostigma

Second and third abdominal tergites with creamy white apical fasciae; propodeum transversely and coarsely cicatrose, the dorsal basal trigonal area radiately grooved; females with the clypeus notched medio-apically, the pygidium with scattered punctures; males with brushes of hair along the anterior margins of the fourth, fifth and sixth sternites; (Chilean forms) .... *velutinum* (Spinola)

Second abdominal tergite only with a creamy white apical fascia; propodeum not cicatrose posteriorly, at most only punctate, the dorsal basal trigonal area not grooved; females with the clypeus entire medio-apically and the pygidium finely, longitudinally striate; males without brushes of hair on the abdominal sternites; (Patagonian forms). *unicinctum* (Brèthes)

Harpactostigma (Harpactostigma) velutinum (Spinola)

Hoplisus velutinus Spinola (in Gay), Hist. fis. pol. Chile, Zool., VI, p. 337; Hymen., pl. 2, fig. 3; (1851); [♂; Central Provinces, Chile.].—Reed, An. Univ. Chile, LXXXV, p. 638, (1894).

Gorytes velutinus Handlirsch, Sitzber. Akad. Wissen. Wien, XCVII, p. 459, (1888); [♂].—Jaffuel & Pirión, Rev. Chileña Hist. Nat., XXX, p. 378, (1926); [Valleys near Marga-Marga, Chile.].

Gorytes (Hoplisus) velutinus Brèthes, An. Mus. Nac. Hist. Nat. Buenos Aires, XVII, p. 461, (1909); [Chacras de Corias, Mendoza province, Argentina].

Harpactostigma velutinus Ashmead, Canad. Entom., XXXI, p. 299, (1899).

Harpactostigma velutinum Pate, Mem. Amer. Ent. Soc., IX, p. 30, (1937).

Type.—♂; Central Provinces, Chile.[13]

Although I have not seen Spinola's type of this species, nevertheless I have had an opportunity to examine and study material which agrees very well with his excellent description and figure. In the copies of Gay's Atlas which I have examined, the figure of *Hoplisus velutinus* has been obviously miscoloured, the distinctive red first abdominal segment and legs and the characteristic creamy white abdominal fasciae being portrayed as yellow. The present species is readily separable from its Argentinian relative by the characters given in the foregoing key to species.

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[13] This type is, in all probability, in the Spinola Collection, now in the Museo Zoologia et Anatomia comparata della R. Universitá, Turin, Italy.

Distribution.—This species is confined largely to Chile. Brèthes has recorded material taken by P. Jörgensen in December, 1907 at Chacras de Corias in the province of Mendoza (del F. C. T.) in the Argentine. Jaffuel and Pirión state that this rare form is not uncommon in the valleys near Marga-Marga, in the Chilean province of Valparaiso, flying there during the months of October and November.

Specimens examined.—CHILE: 2 ♂, Limache, Valparaiso province, September 1916, (P. Herbst), [Museum of Comparative Zoology]; 1 ♀, Cerros de Tiltil, Santiago province, January 16, 1919, (P. Herbst), [M. C.Z.]; 1 ♂, 1 ♀, Valparaiso province, (A. Faz).

Harpactostigma (Harpactostigma) unicinctum (Brèthes)

Gorytes unicinctus Brèthes, An. Mus. Nac. Hist. Nat. Buenos Aires, xxiv, p. 130, (1913). [♀.]

Type.—♀; Mendoza, Argentina; [Museo Nacional de Historia Natural de Buenos Aires].

I have not seen Brèthes' type of this species, but there is before me a series of specimens that agree very well with his description.

Remarks.—This is seemingly a somewhat anomalous species of *Harpactostigma* for in the males there is an apparent tendency for the stigmatal grooves to become somewhat obsolescent ventrally, while in the females there is likewise an apparent tendency for the lower portion of the episternal suture of the mesopleura to be present and approach the omaulus. These, however, are only artifacts due to the rather coarse puncturation of the mesopleura and the propodeum. In the hind wings there is a tendency for the cubitus to arise slightly before the transverse median vein, while the antennae are appreciably shorter than those of its congeners. Nevertheless, the general habitus and all essential structural features agree very well with the type of this group and consequently I feel quite certain that Brèthes' species should be assigned to this complex of the Gorytines.

Distribution.—The present species is apparently confined entirely to the Cisandean piedmont of the western provinces of the Argentine.

Specimens examined.—ARGENTINA: 2 ♀, Mendoza, (C. S. Reed), [Cornell University]; 3 ♂, 1 ♀, Potrerillos, Mendoza province, 4000 ft. altitude, March 16-20, 1920, (J. C. Bradley), [C.U.].

THE POST-OAK LOCUST (DENDROTETTIX QUERCUS) IN THE EASTERN UNITED STATES, WITH NOTES ON MACROPTERISM IN THE SPECIES

(ORTHOPTERA: ACRIDIDAE)

BY JAMES A. G. REHN AND JOHN W. H. REHN

(Plates V and VI)

One of the most remarkable North American species of Acrididae is the Post-Oak Locust (*Dendrotettix quercus*), which appears in waves of devastating local abundance separated by periods of virtually complete absence, exhibits to an exceptional degree marked dimorphism in alar development, and in addition has, as far as present knowledge goes, a discontinuous distribution. First known from northeastern Texas,[1] it was early found to occur over a considerable area in nearby states, reaching as far north as Nebraska, southern Iowa and even Illinois. The present article has to do with its presence on the Atlantic seaboard, an area widely separated from that to which it was for a number of years supposed to be restricted.

History in the Eastern States

A matter of thirty years ago Mr. Erich Daecke, of Philadelphia, brought to the senior author for determination a single specimen of this locust taken by him August 11, 1907, at Bamber, Ocean County, New Jersey. Its very distinctive appearance permitted its prompt recognition as the destructive Post-Oak Locust (*Dendrotettix quercus*), of the Mississippi Valley region. This specimen, which is now before us in the Hebard Collection, was recorded in the third New Jersey list of insects,[2] and as there stated was the first (published) report of the capture of the species in the eastern United States.

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[1] Described by Packard, Fifth Report U. S. Entom. Comm., p. 214, (1890).

[2] J. A. G. Rehn, in Smith, Rep. N. J. State Mus., 1909, p. 183, (1910).

Following closely upon the record of the Bamber specimen the literature contains a number of reports of the occurrence of this destructive species in New Jersey and in Long Island as well. Davis captured it in 1910 (August 16) a mile west of Lakewood and at Ridgeway, in Ocean County, and the next year (August 13) found it in devastating numbers on oaks at the latter locality,[3] and his description of its abundance, actions and destructiveness is the first detailed information we have of the species in the eastern United States.

On July 19, 1911, Dr. Witmer Stone collected a single macropterous male of *Dendrotettix* at Atsion, Burlington Co., New Jersey, which is now before us.

In August 1912 Davis could find no trace of the locust in the areas so badly defoliated in 1910 and 1911, and that year the same collector took a single specimen at Yaphank, Long Island, New York.[4] Mr. Davis has informed us that the late A. C. Weeks took the species at the latter place as far back as August 17, 1889, which is clearly the earliest date we have for the species in the eastern United States. In 1913, Mr. J. B. Walter took a macropterous female specimen at Spray Beach, Ocean County, from beach grass (*Ammophila*), and in 1915 Mr. Bayard Long took another female, also macropterous, alive at the edge of surf in beach wash-up at the same place, both of which have been recorded by Fox.[5] In 1914 Mr. Frederick Schott took *Dendrotettix* at Lakehurst, in Ocean County, as recorded by Davis,[6] and the same year there was a serious outbreak reported from near New Lisbon, Burlington County, but this locality should be stated more correctly as about two miles east of Lower Mill, observations on which were published by Mr. Caudell.[7] Mr. H. B. Scammell, who kept this infestation under observation for some time, has kindly placed in our hands some notes made at the time on the area and character of this outbreak. On June 17 the area was first visited and the *Dendrotettix* individuals were then about half grown. The area infested covered at first somewhat over one square mile, but later this had increased to about two square miles. While there was some feeding on other vegetation, the oak trees were preferred and many already had their leaves riddled. The hoppers were seen in groups of twenty or more in sunny areas on the tree trunks. By September 27 no locusts were to be found in the area which had been so heavily infested with immature hoppers three months previously. Dr. Emlen P. Darlington, Vice-President of the American Entomological Society, has placed in our hands an adult brachypterous female and an immature (but clearly macropterous) female taken June 14, 1914, " on oak near Upper Mill ", which is located about two miles southeast of Lower Mill and doubtless represented the edge of the same outbreak. This is the earliest date we have for adult material.

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[3] Entom. News, XXIII, p. 2, (1912).

[4] Bull. Brooklyn Ent. Soc., X, pp. 33 and 34, plate, (1915).

[5] Circular no. 138, Bur. of Statistics and Inspect., New Jersey State Dept. of Agric., p. 51, (1928).

[6] Bull. Brooklyn Ent. Soc., X, p. 34, (1915).

[7] Psyche, 1915, p. 54.

In 1922 an outbreak took place in the neighborhood of the New Lisbon State Colony at Four Mile, Burlington County, which is doubtless the one referred to as five miles southeast of New Lisbon by Fox,[8] and visited by him after the outbreak was on the decline. Dr. Darlington, who resides at New Lisbon, had occasion to observe this outbreak, and we wish to thank him for the following note: " On June 17, 1922 . . . my attention was called to the grasshoppers by the Colony boys who found them in great numbers on the sidewalks and on the vines on the Hospital porch. Specimens taken at that time were checked with specimens identified as *Dendrotettix longipennis* Pack." (=*D. quercus* Packard, macropterous phase) " taken in 1914 " (Lower Mill outbreak above mentioned). " I made no investigation regarding feeding habits, size of colony or exact location of colony ".

Dr. Darlington has in his collection one male and two females, all macropterous, taken, as the labels state, July 17, 1922, " along road from Lower Mill to Four Mile Colony," where the species occurred " in great numbers on oak shoots following forest fire."

The Hebard Collection contains material taken August 31, 1922 by Dr. Henry Fox, which he had labelled Brown's Mills

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[8] See footnote 5.

Junction. In reply to our inquiry Dr. Fox writes: "I am practically certain that the outbreak of 1922, which I observed August 31, must have been a continuation of that observed June 17 at the State Colony at Four Mile, because my material came from a section of woodland roughly midway between Brown's Mills Junction and Four Mile, not far from a locality marked on old maps as 'Lower Mill'. I clearly recall that I was puzzled to know to what locality to assign my material, as there was no clearly defined locality anywhere near and Brown's Mills Junction was the first place I reached on emerging from the woods".

Material before us also shows the species was in evidence again in 1922 at Lakehurst, Ocean County, Mr. H. B. Weiss having taken it there July 17.

In 1926, as reported by Fox,[9] Mr. Ezekiel Rivney reported a *Dentrotettix* outbreak "in the woods about two miles southeast of Red Lion," Burlington County. This locality would be slightly more than six miles to the east of Medford and is the most western point from which the species has been reported in the state. Fox visited the locality three weeks after it was observed by Rivney but failed to find a single individual, which, as Fox suggests, may have been due to a protracted northeast storm in the intervening time. Fox also reports that he took a macropterous male between Quaker Bridge and Mount Washington, Burlington County (August 9), but the specimen now before us, from the Hebard Collection, is a female.

The year 1928 witnessed another outbreak in the Lower Mill—Four Mile Colony area, which was observed by Dr. Henry Fox on July 4 and 28, and a considerable series of the species taken by him at that time is now in the Hebard Collection. On the first mentioned date only immature individuals were taken, but apparently most, if not all, were adults by the 28th. He informs us the outbreak was at or very near to the present site of the Ong's Hat or Four Mile traffic circle, which is located midway between the Four Mile State Colony and the nearly vanished settlement of Ong's Hat. Dr. Fox also noticed the species at Quaker Bridge, Burlington County, where he collected two immature females on July 4, 1928.

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[9] See footnote 5.

The records here given cover the reported occurrence of the species in the eastern United States as far as known to the authors, as well as available material. We have at times been verbally informed by others of the presence of the species in the Pine Barrens but were prevented by official or other duties from visiting the localities and making personal observations.

One of the Philadelphia entomologists, Mr. Mark Robinson, has informed us of an outbreak in 1934 observed by him between Brown's Mills Junction and White's Bog, which would be a few miles to the northward of the area covered by the Mount Misery one discussed below. Similarly Mr. Robinson and two other Philadelphia colleagues, Mr. Raymond C. Casselberry and Mr. Lawrence J. Bottimer, noticed *Dendrotettix* in destructive abundance in 1936 at a point along the highway five miles east of Red Lion, Burlington County, which would be approximately three miles west of the Ong's Hat—Four Mile traffic circle. Our colleague, Mr. H. Radclyffe Roberts noted *Dendrotettix* at a point along the highway between Red Lion and the Mt. Misery area on August 30, 1937. A moderate number (about 100 individuals) were found in oak saplings in a cut-over area of about 200 square yards. Of the macropterous phase but a single one was seen.

Beyond question many other local outbreaks of this remarkable locust have occurred in New Jersey in the last two decades, but until the Summer of 1936 was had never had opportunity to see *Dendrotettix* in life, much less witness the destruction it can create in its periodic and concentrated abundance.

The 1936 Mount Misery Outbreak

On June 2, 1936, Mr. J. Paul Allen, Forest Supervisor of the Lebanon State Forest, on the Burlington-Ocean County line, noticed that something was completely defoliating the oak trees on the section of this reserve between the North and South branches of Mount Misery Brook, which is one of the upper tributaries of Rancocas Creek. This area is southeast by east of New Lisbon a distance of approximately five miles. On June 25 Mr. Allen called Dr. Darlington's attention to the condition in this area and on June 27 they ascertained the damage was being caused by the Post-Oak Locust.

Under date of July 25, 1936, Dr. Darlington wrote the senior author calling his attention to the outbreak, which was located to the south of the little stations of Upton and Buckingham on the Seaside Park Branch of the Pennsylvania Railroad. On July 27 Dr. Darlington again visited the area and a series of specimens then collected were mailed to the senior author.

On August 1, a bright clear day, in company with Dr. Darlington, Ranger Roswell M. Roper of the New Jersey Forest Service and Mrs. James A. G. Rehn, we visited the area in question, and the following observations were made that day and on a subsequent August 4 visit.

The area of infestation had been carefully worked out by Messrs. Allen and Roper, and our observations during our visits fully substantiated the following information which Mr. Roper most kindly gave to us. The total area covered by the outbreak was approximately two miles long and one and one-half wide, including about 1700 acres of which nearly 500 constituted the section with the most severe infestation. This more heavily ravaged area centered about the Middle Branch of Mount Misery Brook, and to the east of a low hill known for many years as Mount Misery. The area was made up of two east and west disposed tracts, separated by a long narrow strip of uninfested forest. The northern edge of the whole area was approximately a mile south of the Pennsylvania Railroad, reaching from a short distance east of Upton Station eastward to the vicinity of the Burlington-Ocean County line, almost all of the infested area being in Burlington County.

The Mount Misery area is but a few miles to the eastward of the point (" about two miles east of Lower Mill ", which latter is slightly over one mile southeast of New Lisbon) where Mr. H. B. Scammell found the 1914 outbreak of the species mentioned in the preceding history.

Infestation in the Mount Misery area was very heavy on August 1, and in its most extreme condition the leaves of the oaks, both tall trees and scrub, were almost completely eaten, leaving only the midrib and the principal laterals. In the more southern of the two strips which were affected the infestation was largely in what are for the New Jersey barrens quite tall oaks, some probably forty or more feet high, and the destruction of the foliage was just as thorough in the tree-tops as in the lower growth beneath the same trees. It was so pronounced that the normal tree canopy was virtually non-existent and sunlight reached the ground surface normally in shade. The larger trees were white oaks, but Mr. Roper said chestnut oak was also preferred. Apparently the various scrub oaks were not relished. In the Mount Misery forest pines are scattered through the oaks, but are in a decided minority. No damage, apparently, had been done to the pines, although sometimes *Dendrotettix* was found climbing the trunks of these trees.

The insects were all adult, and in very great numbers walking or jumping on the ground, climbing up the branches and twigs of the oak and huckleberry undergrowth, and moving steadily upwards on the tree trunks, singly, in groups, or in a lesser number of cases resting there quietly or in coitu. Aside from the urge for climbing, those on the tree trunks were not especially active, seldom jumping until well disturbed, but often sidling about the trunks, and climbing generally on the sunny side. In many of their actions they suggested individuals of the related *Appalachia hebardi.* While we found *Dendrotettix* rather general in huckleberry ground cover in the infested area, the locust was not as abundant there as on the oak cover or on the oak trunks. There was definite evidence of some damage to huckleberry foliage, but far less than to that of the oaks.

It was not possible to make even an approximate estimate of the areal abundance of the species, but it was clearly as great as that of any locust infestation we had previously seen anywhere. One tree trunk might have one locust or none, the next one as many as a dozen to the height of one's head and many more climbing above that point. The upward urge which sent scores of thousands climbing to the tree-tops is one of the most spectacular angles of the outbreaks of this strange species, and was found in both sexes.

Both the brachypterous and macropterous phases were present, and they were found mated in a number of instances. Counts of the percentage of macropterous to brachypterous individuals were made by means of definite beatings of low cover. These ranged from as much as 50% to as low as 15%, with an approximate average of 20%. As far as we could determine there seemed to be no marked sexual predominance of macropterism. Seldom did macropterous individuals use their wings, and then only in a fluttering fashion which parachuted them a short distance. Clearly macropterism in this species is an atavistic condition and brachypterism the norm.

The stage intermediate between the two extremes was represented by a small percentage of the locusts seen, and a number of specimens of this transitional condition were collected. The wings are well developed as far as form is concerned, but they are reduced in the same degree as the tegmina.[10]

The gray color phase was less abundant than the greenish toned one, the latter apparently being the more normal color type.

No evidence of oviposition was seen although many of the individuals were old and battered, with the alar organs of most of the macropterous ones, particularly females, badly chewed, while in brachypterous specimens one of the tegmina often was missing or both were badly damaged. It was, however, difficult to believe, with such vast numbers of the species still present, that oviposition had been very nearly completed, particularly when mating was still taking place, at least, a week later.

On August 4, 1936, four days later, the authors again visited the infested area, in company with Messrs. E. R. Tinkham and K. F. Francis Chang. The day was at first cloudy, but cleared as work progressed. The upper (i.e. more northern) of the two tracts was found to have the locusts much less in evidence than on August 1. The lower tract was examined in more detail at essentially the same point as on August 1. The general conclusions drawn from the August 4 observations were:

(a) The number of locusts evident to the eye was hardly more than one-third that of August 1.

(b) There was no extensive or mass indication of the upward movement on tree trunks, such ascending individuals as were noticed being usually singles.

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[10] Scudder in his Revision of the Melanopli (Proc. U. S. Nat. Mus., xx, p. 92, footnote 1, (1897)) called attention to a single female of this stage from Texas, contained in the U. S. National Museum series.

(c) Macropterous individuals were proportionately less numerous. Whether they function in shifting the seasonal successors of the colony is definitely not known. All clearly evident is that at a given point in a waning outbreak the macropterous individuals become less evident, quite out of proportion to their previous abundance.

(d) Very definite evidence of parasitism was found. Numerous locust specimens dropped maggots in cyanide bottles, many others were found to carry maggots, and of twelve females selected at random and specially examined four had maggots, which apparently were feeding on the fat bodies and gonads in their abdomens. Flies were seen hovering over locusts, but no actual oviposition was noted.

(e) Evidences of a high mortality were the numerous dead individuals seen. While no maggots were found in these individuals, in several fat bodies were at least in part destroyed. The possibility of a microrganic control must be considered in this connection.

(f) A far smaller proportion of mating individuals were seen. Proportionately more females were on the ground than on August 1.

(g) The area of infestation showed a definite increase in numbers of other species of native Orthoptera when compared with August 1.

On August 4 live material of both sexes (some 50 in all) was collected, taken to Philadelphia, placed in a large outdoor cage with deep sandy loam brought from the Mt. Misery area and supplied with frequently changed and freshly-cut white oak sprigs and leaves. The locusts apparently relished the leaves, were frequently seen mating, but no oviposition was observed and in the procession of the season finally all died. The cage with soil and remaining oak leaves and twigs undisturbed was allowed to remain out-of-doors over the winter and developments awaited in the spring of 1937. There was no evidence of young locusts by mid-June, and a careful break-up of the soil in the cage gave no explanation. No parasitized or unhatched egg-pods were found. We do know definitely the female locusts lived for some weeks after they were brought to Philadelphia, and, therefore, could hardly have oviposited before their removal from Mt. Misery, as oviposition is usually followed by early death.

Through the kindness of Dr. H. C. Hallock we have learned that a fly which emerged from one of the specimens of *Dendrotettix* represents *Sacrophaga atlanis* Aldrich.[11] From this it seems entirely reasonable to conclude that the numerous maggots taken from individuals of *Dendrotettix* represent this species.

Under date of August 8, 1936, Dr. Darlington wrote us that he had visited the Mt. Misery area the previous day and that the locusts were then much less numerous than when we had visited it on August 1, and that proportionately more mating was taking place.

Absence of the authors in the field in Florida during the last third of August and the first portion of September prevented us from making periodic checks at Mt. Misery as to the time of complete disappearance of the adults of *Dendrotettix.*

Dr. Darlington has just informed us that an examination of the Mt. Misery area during the summer of 1937 disclosed little evidence of *Dendrotettix* (i.e. one live specimen and several dead ones), while the oaks, which were so badly defoliated by the 1936 infestation, were leafless, having been killed in the area of maximum concentration of locusts at that time.

Regional Occurrence in New Jersey

With the exception of the two specimens recorded from Long Beach Island (Spray Beach), both of which were macropterous and may have been wind-blown waifs, all the New Jersey records have been from areas definitely within the Pine Barren region of the state, and the outbreaks of damaging character all have occurred along the western or northern border of the barrens. In addition they have been where the oak cover is taller than the average Pine Barren oak.

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[11] Aldrich (Sarcophaga and Allies in North America; Th. Say Found., Ent. Soc. Amer. I, p. 101, (1916)) gives the following information on the type of this species, "from *C*[*aloptenus*] *atlanis*," (in more modern terminology *Melanoplus atlanis* = *Melanoplus mexicanus*) "Franklin, N. H." Also he refers one to Marlatt (Insect Life, II, p. 68, (1889)) who states that about five percent of the individuals of the Lesser Migratory Locust ("*Melanopus* [sic] *atlanis*" = *Melanoplus mexicanus*) contained Dipterous larvae (*Tachina* and *Sarcophoga* [sic]). This along with the present information on *Dendrotettix* would seem to indicate that *Sacrophaga atlanis* may play some part in the natural control of our North American devastating locusts.

From the evidence now in hand it would seem that the damaging outbreaks in New Jersey of which we have knowledge can be grouped in two categories, i.e. those of the Lakehurst-Ridgeway area and those of the Four Mile-Mount Misery one. The former area apparently is less extensive than the latter, which includes outbreaks known from points extending from near Red Lion on the west to White's Bog on the east, a distance of twelve to thirteen miles in an air-line. Doubtless other foci exist and the scattered single specimens which have been reported or listed on a preceding page may represent strays from such unreported outbreak centers. On the other hand they may represent a minimum population of broader distribution which, under conditions not known to us now, holds the potentiality of great and sudden increase in population and consequent damaging abundance.

Dr. Henry Fox has informed us that he feels a *Dendrotettix* outbreak is likely to occur in New Jersey every three or four years, judging from past experience, and that since the outbreak of 1928 he is practically certain three or perhaps four have occurred in the Four Mile–Mount Misery area before that of 1936.

The usual explanation of *Dendrotettix* in New Jersey is accidental introduction from the western area of its occurrence. To realize the improbability of this explanation one needs only to understand the physical characteristics, the distribution of the present human population and the past history of the Pine Barrens. The areas where the outbreaks have taken place are, in the main, as nearly undisturbed as one can find in most of the eastern United States. Taking the Mount Misery outbreak as an illustration there is no permanent settlement of any size nearer than three miles, the forested territory solidly surrounding the section which was ravaged, thus shielding it from more peripheral continued human occupancy.

Much of the territory from which *Dendrotettix* is known in New Jersey, except along the main roads crossing the barrens, carries today a smaller population that it did seventy or more years ago. Moreover, the Mount Misery and Lower Mill outbreak areas are not even along the main highways. In the days of the iron industry in southern New Jersey, a century or more ago, the scattered furnaces and forges through the pines gave to this whole district a more permanent population than much of it has today. Many of the side roads through " the pines " date back to the days of the bog-iron industry. When these furnaces and forges were centers of activity the western habitat of *Dendrotettix* was a terra incognita. Since that time cranberry growing, huckleberry gathering and a small amount of lumbering, chiefly in the swamps for white cedar, have been the sole occupations of the inhabitants and none of these would be a likely avenue of introduction for a species known elsewhere only from the Mississippi Valley. Its occurrence at Yaphank, Long Island, and there as far back as 1889, tends further to support the claim that the locust is not an accidental introduction.

We have already expressed our scepticism regarding the possibility of the introduction of *Dendrotettix* into New Jersey.[12] The accumulated information and our experience with the Mount Misery outbreak has deepened this doubt into a firm conviction that the species is endemic. On account of its localization and periodicity, as well as the fact that it apparently prefers undisturbed natural cover, we feel that its presence has been overlooked in the past. It seems within reason that it has had a broader distribution to the southward, and that its two known areas were connected. That they may be so today is not impossible, as the species is quite local and of an irregular periodicity everywhere it occurs. Both of these factors would tend to cause it to be overlooked. Again, if the two areas of its distribution are not connected, their separation may have been due to Pleistocene climatic conditions extirpating the species over a portion of its earlier distribution. The distinctive dimorphism, periodic swarms and decided localism of the species convince us it is a relatively old type, quite capable of surviving since at least early Pleistocene times.

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[12] Trans. Amer. Entom. Soc., LXII, p. 21, footnote 33, (1936).

Period as Adults

An analysis of the records of the species' presence in the East, both published and here presented, shows that the earliest date represented by adult material is June 14, when Dr. Darlington took an adult brachypterous female, now before us, near Upper Mill, in 1914.

On July 17 Weiss found the insect adult at Lakehurst in 1922, and on the 19th adults were abundant the same year along the road between Lower Mill and Four Mile Colony, and on the same day of the month in 1911 and 1913 single adults were taken at Atsion and Spray Beach respectively. On August 1 no immature specimens were seen among the tens of thousands of locusts observed by us in the Mt. Misery area.

Almost all of the records of the species' occurrence in New Jersey and New York are for dates in August, but a single one, at Yaphank, Long Island, New York, being as late as September 3. On September 27 no locusts were to be found, according to Scammell (in litt.), where the species had swarmed earlier the same year. From this it is safe to conclude the species is usually adult between late June and the first week of September.

The Role of Macropterous Individuals

The presence of dimorphism naturally raises more than one question as to its possible function in a species' economy. In *Dendrotettix* we find a number awaiting solution. Do the macropterous individuals spread more widely, by actual short flights or by wind parachuting, than the brachypterous ones, and are they the chief factor in establishing colonies elsewhere? We are not in a position to answer either question, but can point to several facts which may be indicative of the general trend. These are that the stray individuals taken away from mass colonies (as far as known) have invariably been macropterous, also that as an outbreak ages (as the Mt. Misery one) the percentage of macropterous individuals drops appreciably. We are giving below some figures which have significance in their bearing upon this question. Our Mt. Misery experience demonstrated that as the outbreak aged the proportionately increasing body of brachypterous individuals were parasitized in a strongly augmented ratio. What had become of the individuals which gave a far higher percentage of macropterous locusts at the same point but four days previously we are unable to say. Do they become peripheral colonists for the establishment of future populations sufficiently removed to give a guaranteed food supply, the "old home" having had its trees killed or at least severely injured by the locusts' earlier devastations? Is the presence of the macropterous phase a response to population pressure in the immature stages, corresponding to the known and demonstrated influence of over-population in developing more strongly alate and migratorially incited individuals in a number of the migratory locusts? These are questions still to be answered in the case of *Dendrotettix.*

Sexual Predominance of Macropterism

In material before us making up seven large or fair-sized series from New Jersey, totalling 870 specimens, three series show a greater percentage of macropterism in the male sex (difference ranging from 1 to 14%) than in the female, in two the ratio is equal (18% of total in each case) and in two the greater percentage (difference ranging from 3 to 27%) is in the female. In the case of the last mentioned percentage, however, there was definite effort to collect the more unusual macropterous type, but not solely in the female sex. These figures show there is no set rule as to a predominance of this phase in either sex.

Ratio of Macropterism and Brachypterism in Series

In a series of 221 individuals (108 ♂, 113 ♀) taken July 28, 1928 by Fox and labelled " Brown's Mills " and " New Lisbon ", although as shown above really from near the Four Mile (or Ong's Hat) traffic circle, we find in the males a ratio of 18% macropterous to 81% brachypterous, the difference (1%) being intermediate. In the females of the same series we find the ratio 11% macropterous to 84% brachypterous, with 5% intermediate. Another series of 38 (28 ♂, 10 ♀) taken by Fox on August 31, 1922, near Lower Mill, but labelled Brown's Mills Junction, shows in the males 21% macropterous to 79% brachypterous, in the female 10% macropterous to 90% brachypterous.

A series of 24 (12 ♂, 12 ♀), taken at Mt. Misery, July 27, 1936, by Dr. Darlington, showed the same ratios for both sexes, i.e. 8% macropterous, 8% intermediate and 84% brachypterous. A series of 113 (24 ♂, 89 ♀) taken by us, August 1, 1936, in the more northern of the two areas covered by the Mt. Misery outbreak — which we have labelled as 1 mile southwest of Buckingham—shows in the males 4% macropterous, over 8% intermediate—and over 86% brachypterous, in the females 31% macropterous, over 4% intermediate and over 64% brachypterous. In this case a definite effort was made to collect a series of macropterous individuals regardless of sex. A larger series taken the same day in the more southern or Mt. Misery area totalling 323 specimens (193 ♂, 130 ♀), shows the following ratios, in the male 23% macropterous, 3% intermediate and over 73% brachypterous, in the female over 9% macropterous, over 4% intermediate and 86% brachypterous.

A selected series of 151 individuals was taken by us at the same place on August 4, 1936, but as it would not supply ratios the figures are not of value in this connection. Our observations, recorded at that time, showed a distinctly lower percentage of macropterous individuals than was found three days before.

From these figures it is evident that taking available material as a criterion there is no rule as to sexual predominance of macropterism. Neither do we have enough evidence to show conclusively that in infestation areas there is any high percentage of macropterous locusts, although our observations at Mt. Misery indicate a falling off of the macropterous individuals as the colony ages.

What can be stated with some warrant is that the normal percentage of macropterous individuals in mass outbreaks runs in the neighborhood of twenty per cent of the total, with the intermediate stage seldom over five per cent. The figures taken from the various collected series in the aggregate support the ratio found by us in the field at Mt. Misery.

The Intermediate Stage

We are presenting a photograph of a specimen in the intermediate stage (Plate VI, figure 6), together with brachypterous and macropterous individuals of both sexes. It will be seen from this figure that both the tegmina and wings are fully formed in this condition, although they are greatly reduced. The tegmina, moreover, are quite different from the pad-like tegmina of the brachypterous phase.

New Jersey Specimens Examined

In the preparation of this paper the following previously reported or unrecorded material, all in the Philadelphia Collections, was consulted.

Bamber, N. J.; August 11, 1907; (E. Daecke); 1 ♀; [Hebard Cln.]. Atsion, N. J.; July 19, 1911; (Witmer Stone); 1 ♂; [A.N.S.P.]. Ridgeway, N. J; August 13, 1911; (W. T. Davis); 1 ♂, 1 ♀; [Hebard Cln.]. Spray Beach, N. J.; July 19, 1913; (J. B. Walter); 1 ♀; [A.N.S.P.]: August 1, 1915; (B. Long); 1 ♀; [A.N.S.P.]. Lakehurst, N. J.; July 17, 1922; (H. B. Weiss); 1 ♂, 1 ♀; [Hebard Cln.]. Lower Mill (labelled "Brown's Mills Junction"), N. J.; August 31, 1922; (Henry Fox); 28 ♂, 10 ♀; [Hebard Cln.]. Mt. Washington (8 miles north of Green Bank), N. J.; August 9, 1926; (Henry Fox); 1 ♀; [Hebard Cln.]. Quaker Bridge, N. J.; July 4, 1928; (Henry Fox); 2 immat. ♀; [Hebard Cln.]. Brown's Mills Junction, N. J.; July 6, 1928; (Henry Fox); 22 immat. individuals; [Hebard Cln.]. Four Mile (or Ong's Hat) Traffic Circle (labelled "New Lisbon" and "Brown's Mills", N. J.; July 28, 1928; (Henry Fox); 108 ♂, 113 ♀; [Hebard Cln.]. Mt. Misery, N. J.; July 27, 1936; (Emlen P. Darlington); 12 ♂; 12 ♀; [A.N.S.P.]: August 1, 1936; (J. A. G. Rehn and J. W. H. Rehn); 193 ♂, 130 ♀; [A.N.S.P.]: August 4, 1936; (J. A. G. Rehn and J. W. H. Rehn); 71 ♂, 80 ♀; [A.N.S.P.]. One mile southwest of Buckingham, N. J.; August 1, 1936; (J. A. G. Rehn and J. W. H. Rehn); 24 ♂, 89 ♀; [A.N.S.P.].

EXPLANATION OF FIGURES

(All figures one and one-half times natural size)

PLATE V

(Lateral views)

Fig. 1.—Brachypterous male. Mt. Misery, New Jersey. August 4, 1936.

Fig. 2.—Macropterous male. Same data.

Fig. 3.—Brachypterous female. One mile south of Buckingham, New Jersey, August 1, 1936.

Fig. 4.—Macropterous female. Mt. Misery, New Jersey. August 4, 1936.

PLATE VI

(Dorsal views)

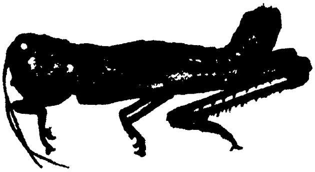
Fig. 5.—Brachypterous male. Mt. Misery, New Jersey. August 4, 1936. (Same specimen as shown in plate V, figure 1.)

Fig. 6.—Intermediate type male. Mt. Misery, New Jersey, August 1, 1936.

Fig. 7.—Macropterous male. Mt. Misery, New Jersey. July 27, 1936.

Fig. 8.—Brachypterous female. One mile south of Buckingham, New Jersey. August 1, 1936. (Same specimen as shown in plate V, figure 3.)

Fig. 9.—Macropterous female. Same data as figure 8.



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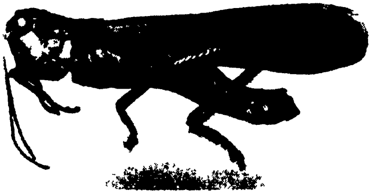

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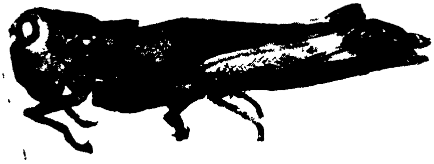

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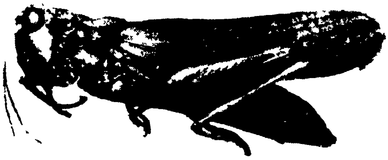

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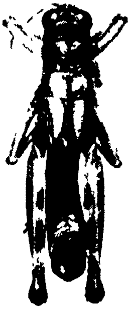
REHN and REHN—POST-OAK LOCUST



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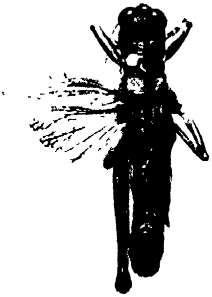

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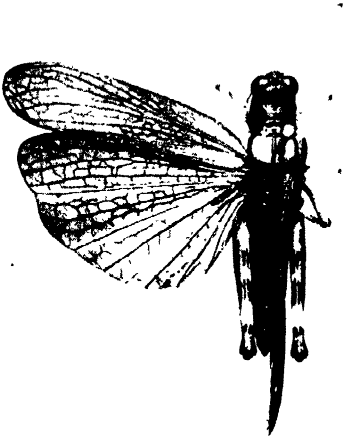

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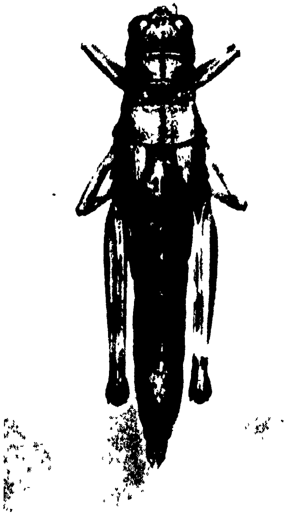

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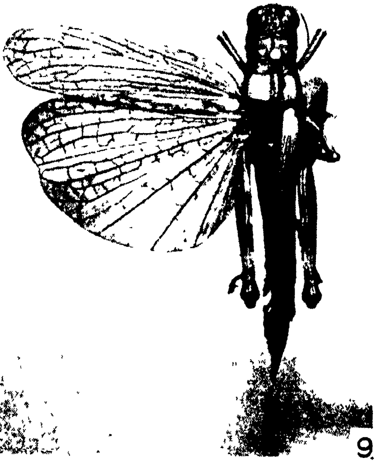

9

REHN and REHN—POST-OAK LOCUST

A NEW GENUS AND FOUR NEW SPECIES OF NEARCTIC ICHNEUMONIDAE

(HYMENOPTERA)

BY H. PEARSON HOPPER
Philadelphia, Pennsylvania

A recent study of the literature of the Ichneumonid subfamily *Ichneumoninae* (Cresson and authors, not Cushman and Rohwer) enabled the present writer to determine the following species, one from his own collecting in 1937, two from Mr. Joseph M. Cadbury's collecting in Maine in 1937, and one found in the collection of the American Entomological Society, as new. The new genus was called to my attention chiefly through the uncertainty of the original describer of the genotype as to its generic position.

The author is much indebted to Mr. R. A. Cushman and Mr. H. K. Townes for criticism of the manuscript and to the Academy of Natural Sciences of Philadelphia for the opportunity to study their collections.

SUBFAMILY ICHNEUMONINAE

TRIBE ICHNEUMONINI

Group Amblypygi

Amblyteles balteatus new species

Belongs to Ashmead's genus *Pseudamblyteles;* but very similar in habitus and most of coloration to *Ctenichneumon electus* (Cresson).

Male: Length 16 mm., antennae about 10 mm., forewing 10 mm. Head and thorax wholly black; abdomen black except segments two and three pale rufous above and below. Antennae fulvous beneath, fuscous above, scape and pedicel black; mandibles ferruginous at middle, palpi apically fulvous; all coxae and trochanters black, forelegs fulvous except femora at extreme base and to middle behind, black; midlegs fulvous except basal third of femora before and all except knee behind; hind femora black, tibiae fulvous, black at apex, tarsi fulvous; wings subhyaline, pale brownish.

Closely moderately finely punctate; mesonotum somewhat shining, as is the scutellum; propodeum more coarsely rugulosely punctate; postpetiole aciculate, shining.

Head transverse, somewhat narrowed behind. Antennae about 45-jointed (apices wanting), setiform and very faintly crenulate, the first joint of flagellum as long as scape and pedicel together, slightly shorter than the second and third joints together, eighth and following joints quadrate. Notauli wanting; scutellum slightly elevated and declivous behind, margined at base; propodeum distinctly areolated, the carinae mostly strong, the costulae and the carinae between the petiolarea and the posterior lateral areas, however, weak though distinct; basal area short, transverse, sloping abruptly into the rather deep groove between metanotum and propodeum, polished and only moderately punctate, elevated to the level of the surrounding carinae; areola comparatively large, subquadrate, slightly longer than wide, corners somewhat rounded, slightly convex at sides, posterior margin with an abrupt angular indentation at middle; paracostulae joining the median longitudinal carinae just behind the areola and strongly oblique, the median longitudinal carinae bowed outward where joined by the paracostulae, straight behind, the petiolarea about twice as long as wide. Legs moderately long and slender, hind femora attaining apex of second tergite. Abdomen elongate-elliptical, one and one-half times as long as head and thorax; second and third sternites with median fold, fourth without; gastrocoeli large, transverse, broader than the space between. Ramellus subequal to first cubital side of areolet, much longer than width of discocubital vein.

Type.—Male; Medomak, Maine; July 27, 1937; (J. M. Cadbury). Type in author's collection.

Amblyteles perannulatus new species

Belongs to Ashmead's genus *Pseudamblyteles.* Very close to *tetricus* Provancher, differing in the more slender antennae, lack of a central impression in the clypeus, the complete white annulus on all tibiae near base, and the very faintly tinged wings. From *torontosus* Davis which it resembles in color, it differs in the much smaller size (*torontosus* is 17 mm.), weakly convex scutellum, distinct carina between basal area and areola, less strongly sculptured abdomen, lack of longitudinal rugosity at base of second tergite, lack of a white humeral line, and scutellum black at extreme base.

Female: Length 14.5 mm., antennae 12 mm., forewing 11 mm. Black; the following white: annulus on antennae from the middle of the eighth to the extreme base of the fifteenth joint, fore tibiae except extreme base and apex, knees of fore femora, broad annulus on mid tibiae from middle to near base, annulus on hind tibiae broader on outer side and interrupted by a narrow brownish longitudinal line within, line beneath wings, scutellum except basal margin narrowly, and apical margins of tergites five to seven each with a large lunate mark not reaching lateral margin; underside of postpetiole, tergites two and three fuscous.

Antennae slightly stout, tapering, compressed from fifteenth joint to tip, somewhat flattened and densely covered with short whitish pubescence beneath, apical margins of joints somewhat nodose, scape one and one-half times as long as thick, first joint of flagel as long as scape plus pedicel and about three and one-half times as long as thick, about one and one-fourth times as long as second joint; joints beyond the tenth subquadrate to quadrate. Head subtransverse; temples as broad as short diameter of eye, slightly narrowed behind, occiput sloping; eyes broader from anterior than from lateral aspect; clypeus truncate, as broad as face, about one-half as long as broad, the foveae large and deep, the clypeus not otherwise separated from face; face above clypeus twice as broad as long; front concave; postocellar line equal to ocellocular line and about one-half the ocelloccipital line; the emargination of the rear of head forming an arc of about a quarter circle; head well separated from the mesonotum. Thorax deeper than broad, the mesopleura one and one-half times as high as broad; notauli sharp for about one-third length of mesonotum, lacking behind; prepectus distinct although the carina not sharp; foveiform impression strong; scutellum subconvex, margined slightly at extreme base; propodeum about as long as scutellum plus postscutellum, angles subdentate; areola distinct with sharp carinae, separated from basal area, one and one-half times as broad as long, the posterior margin concave, the others convex; costulae wanting; lateral carinae of petiolarea obsolete, basal area short and sloping strongly into the distinct fossa between propodeum and metanotum; propodeal spiracles three times as long as wide, separated from base of propodeum by their own length. Legs moderate, hind legs not much longer or stouter than the others, hind femora somewhat surpassing apex of third tergite, four times as long as thick; hind tibia as long as femur plus trochanter, inner spur between one-fourth and one-fifth length of basitarsus. Abdomen exclusive of first tergite three times as long as broad, fusiform; first tergite with petiole slender, postpetiole abruptly widened but not broad, central area distinctly set off; gastrocoeli small, oblique, distinct; segments one to three with ventral fold; hypopygium attaining apex of sixth tergite, covering only the base of the ovipositor; apex of abdomen deep. Entire body distinctly moderately finely punctate, subopaque; scutellum and tergites behind the third more or less polished and finely, weakly, separately punctate; postscutellum, areola, and postpetiole subpolished, the punctures as coarse as on thorax but more separated, and giving a striated effect. Forewing with nervulus interstitial, first cubital side of areolet twice as long as second; ramellus as long as breadth of vein; stigma three times as long as broad.

Type.—Female; Fairmount Park, Philadelphia, Pennsylvania; July 9, 1937; (H. P. Hopper). Type in author's collection.

Group Oxypygi

Ichneumon apicator new species

Belongs in Thomson's genus *Melanichneumon.* Runs in Cresson's key to *Ichneumon,* males, Section I[1] to *merus* Cresson, but differs in its wholly black scape, larger size, more robust form, and stronger sculpture. Differs from any species examined by the author in its extremely weak lunulae on the third tergite. Rather close to *pullatus* Cresson in proportions, punctation, and general coloration, differing in the white annulus on antennae, wholly black scape and hind legs, areolation of propodeum, and other features.

Male: Length 15 mm., antennae 11 mm., forewing 10.5 mm. Black; the following white: narrow annulus at middle of antennae (joints 13-19), faint spot near base of mandibles, lateral margins of face from base of clypeus to just below apex of eyes (broader below), mark on posterior orbits opposite middle of eye and about one-half the length of eye, collar interrupted by a faint blackish mark at middle, short line on upper margin of pronotum before tegulae, scutellum and postscutellum, roundish mark on metapleura posteriorly, fore and mid tibiae anteriorly, spot on hind coxae above near base, apical margin of the central area of postpetiole narrowly, narrow line at middle of apical margin of sixth tergite, broad cuneate mark with broad end forward at middle of apical margin of seventh, and spot on the slightly exserted apical margin of the eighth tergite. Wings subhyaline, pale fuscous.

Body closely, somewhat coarsely, punctate, the propodeum more coarsely; head, scutellum, areola of propodeum, and first tergite polished and separately to sparsely finely punctate; gastrocoeli deep, of medium size, oblique, the space between somewhat longitudinally aciculate; lunulae very indistinct, those of the third tergite hardly discernible save by looking down on tergite with light directed so as to reveal the pubescence, when they show as glabrous areas.

Antennae slender, 47-jointed, somewhat serrate beneath, all joints of flagellum except the first having apical margin produced into a slight ridge, obsolete on upper surface, which appears almost jointless in lateral

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[1] Trans. Am. Ent. Soc., VI, p. 136, 1877.

view, the ridge surmounted by a row of bristles, longest on the highest portion of the ridge; first joint of flagellum not quite twice as long as second, those beyond the fifth quadrate except the apical segment longer than thick; joints of flagellum somewhat oblique when viewed from above. Head subquadrate; cheeks slightly narrower than eyes, produced backward further than short diameter of eyes; occiput moderately deeply impressed; clypeus not separated at base; eyes relatively small and broader in anterior than in lateral view. Epicnemia weak; scutellum moderately convex, sloping behind; propodeum with only the carinae of areola well developed, the areola horse-hoof shaped, distinctly longer than broad; costulae weak but distinct; basal area indistinctly separated from the basal lateral areas; the remaining carinae obsolete or indistinguishable. Abdomen elongate-elliptical, nearly twice as long as head and thorax, portion behind postpetiole about four times as long as greatest breadth; postpetiole short, only moderately enlarged; a distinct ventral fold on tergites one to four; claspers rather large, as long as dorsum of tergite six, obtusely pointed at apex; hypopygium slightly exceeding apex of sixth tergite. Wings with ramellus as long as breadth of discocubital vein. Claws simple, mandibles bidentate.

Type.—Male; Medomak, Maine; August 9, 1937; (J. M. Cadbury). Type in author's collection.

Ichneumon adventicius new species [2]

Remarkable for its superficial resemblance to the Central American group represented by *intentus* Cresson, *tenebricus* Cresson, etc., to which, however, it is wholly unrelated. Belongs to Thomson's genus *Melanichneumon*: its nearest relatives seem to be *merus* and *citatus* of Provancher. Comparison with the type and paratype of *merus* and with a specimen labelled as *citatus* in the collection of the American Entomological Society shows no good character, other than color, to distinguish the latter from the present species. From the type and paratype of *merus*, the type of *adventicius* and the specimen labelled *citatus* are readily distinguished by their more robust abdomen and by the gastrocoeli occupying one-fourth the length of the second tergite with the distance between them considerably less than their breadth, while in *merus* the gastrocoeli occupy but one-fifth of the length of the tergite and the distance between them is equal to the width of a gastrocoelus. All of the specimens agree very closely in all details save color and the structural characters just mentioned.

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[2] Named from its resemblance to Central American forms.

Male: Length 16 mm., antennae 10 mm., forewing 10.5 mm. Black, the following white: annulus (more or less interrupted beneath) on joints 16-21 of antennae, scape beneath, depressed portion of mandibles near base, face and clypeus except the latter very narrowly blackish on extreme margins and a longitudinal black band at center of both (about one-fifth of width of face, very narrow at base of antennae), rather broad anterior and posterior orbits narrowly interrupted at base and apex of eyes, collar, upper margin of prothorax (not interrupted anteriorly), two broad longitudinal lines close together on disk of mesonotum, tegulae, line beneath, mark on lower margin of prothorax above fore coxae, cuneate mark on mesopleura above mid coxa with its point toward coxa, scutellum and postscutellum, mark covering most of metapleura, another on propodeum shaped like a W with very short lateral uprights (the center covering the areola behind the costulae), postpetiole behind the posterior margin of spiracles, apical margins of tergites two to six becoming narrower caudad (those on two to four extending a little forward at sides), apical two-thirds of seven, all visible portion of eight, fore tibiae and tarsi, knees and broad anterior mark on fore femora from base to near apex, fore coxae, mid tarsi, mid tibiae except fine line from base to apex within, knees and short line within on mid femora, outer side of mid coxae, and outer side of hind coxae; venter fuscous along the fold, all distal trochanters and narrow apical margins of all tergites testaceous. Wings brownish-hyaline, apices subhyaline, stigma reddish.

Head large, rather strongly buccate, subquadrate; temples but little narrowed behind, distance across them at middle as great as distance across eyes, their breadth greater than short diameter of eyes; eyes rather small, their short diameter about equal to half the width of face; apical margin of clypeus straight, the upper margin very slightly above the lower margins of eyes, the portion between the foveae not distinctly separated from face; head deeply emarginate behind; ocelloccipital line equal to postocellar line, the latter about one-tenth greater than ocellocular line; mandibles with the lower tooth shorter, somewhat behind the upper and set off from it by a slight depression across its base; mandibles overlapping by about one-third of their length; antennae 45-jointed, moderately slender, scape about one-half longer than broad, first joint of flagellum about equal to scape in length and about twice the length of second joint, joints beyond the first with a ridge at apex, strongest below and obsolete above, the ridge with a row of hairs or bristles; basal joints of flagel oblique in superior aspect, those at apex longer than thick, those from tenth (counting scape) to fortieth quadrate; head polished, finely sparsely punctate. Thorax about twice as long as broad in superior aspect, deeper than broad; the propodeum from above about equal to length of scutel plus postscutel, upper surface sloping caudad, posterior face nearly perpendicular and very slightly concave; areola large, horse-hoof shaped, slightly longer than broad, set close to base, the basal area short, declivous, a rather deep groove separ-

ating propodeum from metanotum; carinae surrounding areola, basal area, and anterior lateral areas moderately strong, the rest weak but distinct except the posterior segments of median longitudinal carinae obsolete; propodeal spiracles short, linear, about three times as long as broad, separated from base of propodeum by their own length; thorax subpolished, moderately finely closely punctate, the punctures much larger and deeper than those on head; scutellum and postscutellum highly polished, rather closely faintly punctate; foveiform impression large, deep, and highly polished; propodeum more coarsely punctate, the areola very finely rugulosely punctate; first tergite polished with a few punctures at base, becoming more closely punctate to apex except the central area at apex polished, impunctate anteriorly and with about six large, weak punctures at tip, central area not distinctly set off save by punctation. Gastrocoeli moderate-sized, deep, polished, and with a few strong longitudinal rugae, the space between longitudinally rugose; tergites behind the first rather coarsely, closely punctate, subopaque, the punctation growing weaker and sparser toward apex, the last tergite polished and with sparse, very faint punctures; narrow apical margins of all tergites membranous, polished, impunctate. Entire body more or less finely, closely short pilose.

Type.—Male; Swarthmore, Pennsylvania; June 11, 1905; (E. T. Cresson, Jr.). Type in the collection of the Academy of Natural Sciences of Philadelphia.

Group Platyuri

THAUMATOTELES new genus[3]

The species on which this genus is founded gave Cresson, its author, considerable difficulty as to generic placement. Having originally described it as *Hoplismenus* because of the propodeal spines, he later transferred it to *Amblyteles* because of the obtuse abdomen, apparently having overlooked the form of the petiole which definitely allies it with the Platyuri. In the keys of Ashmead[4] and Schmiedeknecht[5] it runs near *Rhyssolabus*, differing in lacking the rugosity on the upper surface of the petiole, in the areolation of the propodeum, and in the round cross-section of the propodeal spines. Because of these differences the present genus runs best to *Platylabus*, from which it differs in the broader petiole and correspondingly less distinct postpetiole, in the long

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[3] Greek *θαῦμα*, a cause for wonder, *τέλος*, end.

[4] Proc. U. S. Nat. Mus., XXIII, p. 19, 1900.

[5] Opuscula Ichneumon. fasc. I, p. 25, 1902.

spines, impressed line between the gastrocoeli, and large hypopygium, as well as various other characters.

Head subquadrate, the cheeks in lateral aspect equal to breadth of eyes from same angle, rather strongly sloping; occiput almost vertically declivous from immediately behind posterior ocelli; distance between outer margins of antennal foramina and inner margins of eyes less than one-half the distance between inner margins of antennal foramina; clypeus strongly convex, slightly broader than long, anterior margin straight; labrum evident, rounded before; mandibles rounded at middle, obliquely flattened so that lower tooth is as far behind as below the upper, teeth rather long, sharp, lower somewhat shorter, line through them almost perpendicular to the base of mandibles; flagel of female distinctly flattened and very closely short pubescent below, slightly compressed (wider than deep) and widened beyond annulus; eyes very convex, prominent, slightly overhanging the foramina; antennal basin with a rather strong projection in front of antennae; head set close to mesonotum. Thorax with notauli obsolete; foveiform impression moderately impressed, prolonged shallowly so as to run into mesopleural furrow; scutellum rather strongly elevated, margined to near apex, sides vertically declivous, rear strongly sloping and rounded, upper surface weakly convex; carinae of propodeum strong except the costulae wanting and basal area confluent with areola; fossa between propodeum and metanotum broad and moderately deep; combined basal area and areola large, about one and one-half times as long as broad, the sides nearly parallel and straight, convergent behind, and slightly flaring at base of basal area; propodeal spiracles twice as long as broad, distant from base of propodeum by twice their length; angles of propodeum, strongly spinose, the spines circular in cross-section, the apices blunt, enlarged, about twice as long as thickness of the enlargement and about as long as distance of propodeal spiracles from base of segment. Petiole about one and one-half times as broad as deep, rather broad at base and the sides strongly divergent backward, the postpetiole much broader than base of petiole but not much set off, the elbow at middle of segment, the spiracles about half-way between elbow and apex, about as far apart as from apical margin; gastrocoeli distinct, longitudinal, about twice as long as broad, shallow, the two joined by a band similarly sculptured, and this band bordered behind by a crenulate furrow and set at a slight angle to the remainder of the tergite, the sculpture of the gastrocoeli and connecting area rather coarsely ruguloso-scabrous; abdomen ovate, apex blunt and as deep as broad, hypopygium slightly exceeding the seventh (last visible) tergite; ovipositor sheaths slender. Hind legs much longer and stouter than the others, hind femora three times as long as thick, attaining apex of fifth tergite, coxae very large.

GENOTYPE: *Hoplismenus ornatus* Cresson 1873. (Monobasic.)

Thaumatoteles ornatus (Cresson)

1873. *Hoplismenus ornatus* Cresson, Trans. Am. Ent. Soc., II, p. 92.
1877. *Amblyteles ? ornatus* Cresson, Trans. Am. Ent. Soc., VI, p. 194.

Female: Length 9 mm., antennae 10 mm., forewing 7 mm. Head white except central area of face, a narrow line from this area on each side to clypeal fovea, antennal basin, front, vertex, and rear of head except posterior orbits, all black; mandibles yellowish brown with tips black; scape and pedicel testaceous beneath, piceous above; flagel black with white annulus on 9-14; a transparent, unpigmented area in cheeks above mandibles, extending nearly to lower margin of eyes. Thorax black above and below, white laterally except sutures, foveiform impression and prepectus entirely, and pronotum (except where it borders propleura, humeral line interrupted anteriorly, and spot near middle), black; mesonotum with white lines following the (lacking) notauli from near anterior margin to opposite tegulae; tegulae testaceous, a line beneath, basal sclerites of both pairs of wings, and a line on mesonotum behind forewing extending backward onto the carina of scutellum, scutellum and postscutellum, metanotum on the declivous portion behind fossae, and propodeum behind the areola (except broadly along the juncture with metapleura and narrowly down middle of petiolarea), white. Abdomen ferruginous; apex of postpetiole broadly white laterally, narrowly white at center; tergites two and three broadly white laterally on apical margins, with a narrow band of whitish-ferruginous between; hypopygium and seventh tergite very pale ferruginous. Legs ferruginous, except all basal trochanters, fore coxae except beneath, basal half of mid coxae, and base of hind coxae laterally and above, white. Wings clear hyaline, veins testaceous, stigma stramineous.

Clypeal foveae deep, clypeus not otherwise separated from face; face twice as wide as long, as broad as long diameter of eye; distance from anterior ocellus to line across posterior margins of antennal foramina about equal to distance between outer edges of posterior ocelli; ocellocular line equal to postocellar line; ocelloccipital line about three times postocellar line; antennae 41-jointed with joints of basal two-thirds cylindrical. Thorax distinctly deeper than broad, the pectus slightly narrower than dorsum; prepectus large, margin distinctly raised; mesopleura twice as high as wide; scutellum only slightly narrower behind than before; propodeum as long as mesonotum, posterior face sloping at about 22 degrees from the vertical, basal area about three times as broad as long, separated from areola only by slope; lateral carinae of petiolarea slightly further apart than width of areola, petiolarea twice as long as wide. Abdomen no longer than head plus thorax, portion behind first tergite two and one-half times as long as broad; central area of postpetiole indistinctly set off, apex of tergite sinuate, upper surface of petiole rather flat; second tergite as long as broad, anterior margin about one-half width of posterior; third tergite about two-thirds length of second, fourth slightly shorter, fifth less than one-half as long as fourth, sixth and seventh extremely narrow; seven visible tergites. Hind coxa plus trochanters nearly equal in length to femur. Stigma four times as long as broad; areolet moderate-sized, radial side subobsolete, first cubital side slightly shorter than the second and very little longer than one-half the second intercubitus, which is slightly longer than the first; length of ramellus about one-half the thickness of the discocubital vein; nervulus slightly behind the fork of the basal vein; second recurrent unbroken.

Head polished, finely somewhat sparsely punctate; disks of scutella polished, almost impunctate, lateral fossae longitudinally rugulose; propodeum sparsely, somewhat coarsely rugulose; first tergite polished, sparsely faintly punctate; remainder of abdomen (except gastrocoeli and space between) very finely shagreened. Head and thorax finely sparsely pubescent; abdomen glabrous except apical margins of tergites.

Type.—Female; New York. Type in the collection of the American Entomological Society.

No specimen except the type of this interesting form has come to the notice of the writer and he would very much appreciate information of any other specimens in collections.

STUDIES IN THE SCARABAEIDAE. I.

(COLEOPTERA)

BY MARK ROBINSON
Philadelphia, Pennsylvania

(Text figures)

The material upon which this paper is based is, unless otherwise noted, in the collection of the author. The types, except where otherwise noted, are in the collection of the author, now deposited at The Academy of Natural Sciences of Philadelphia.

Phanaeus vindex cyanellus new variety

Form and size of typical *vindex* Macl., but is bluish-black with the head and thorax bluish-green.

Type.— ♂ ; Chokoloskee, Florida; (George Franck).
Allotype.— ♀ ; with same data.

This color variety of *vindex* occurs only in Florida as far as I know and due to its distinctly different color should be recognized as a good variety.

Aphodius utahensis new species

Oblong, convex, shining, reddish-brown except sides of thorax, elytra, femora and abdomen which are yellowish. The suture of the elytra is reddish-brown and the center and apex of each elytron is slightly darker in color.

Clypeus slightly emarginate, angles broadly rounded, sides slightly arcuate, angles and sides of clypeus slightly reflexed, genae obtuse, not very prominent. Clypeus densely punctured along the edges, gradually less densely punctured towards the center of the head, punctures are separated by from two to three times their diameter between the eyes.

Sides of thorax straight, arcuately narrowing in front. Hind angles well defined, rounded. Base with a fine but distinct marginal line. Sides of thorax moderately coarsely punctured with a few fine punctures intermixed, the disk has but few coarse punctures, the fine punctures being predominant. There is an impunctate longitudinal area on the center of the disk.

Elytral humeri obtuse, sides of elytra slightly arcuate. Striae not very deeply indicated, closely not very deeply, crenately punctured. The intervals are slightly convex, very finely, sparsely punctured. The punctures are in two irregular rows.

Body beneath not very distinctly punctured.

Anterior tibiae smooth in front and crenate above the third tooth, the first tarsal joint shorter than the second. The spur is curved and acute.

Length: 4.8 to 6.8 mm.; width, 2.35 to 3.1 mm.

Type.—♂ ?; Richfield, Utah; August 15, 1929; (light trap).

Paratypes.—13 specimens with same data as type.

These specimens were sent to me several years ago by D. Elmo Hardy and were probably collected by him. *Utahensis* is near *obtusus* Leconte but can be easily recognized by its lack of a groove on the mesosternum and the fuscous spot on the center of each elytron. Designated paratypes, the sexes of which are indeterminable, have been distributed to the collections of O. L. Cartwright, R. C. Casselberry, L. J. Bottimer, and The Academy of Natural Sciences of Philadelphia.

Aphodius washtucna new species

Probably nearest to *Aphodius dilaticollis* Saylor but differs from this and all other species in the *cadaverinus* group by not having a basal marginal line.

Oblong, convex, piceous, shining.

Head not tuberculate, moderately, rather closely punctured, a few coarse punctures above the eyes. Clypeus rugose, anterior margin broadly emarginate, the angles rounded and slightly reflexed. Genae moderately prominent and slightly acute.

Prothorax a third wider than long, widest just before the middle. Sides arcuate, narrower at base than at apex; hind angles broadly rounded. There is just a trace of a basal marginal line at the middle, obsolete on each side. Sparsely and finely punctured with coarse punctures intermixed; coarse punctures are more numerous laterally.

Elytra oval, widest just behind the middle. Humeral angles rounded not dentiform. Striae very fine; punctures fine and sparse; intervals slightly convex and very finely punctured.

Mesosternum obtusely carinate between the coxae. Abdomen finely, sparsely punctured, rugose and hairy laterally.

Spur of anterior tibiae thicker in the male than in the female, curved inwards in both sexes. Hind tibiae with equal spinules at the apex. First joint of hind tarsus nearly equal to the next three. Short spur of middle tibiae, in the male two fifths as long as long spur, in the female three-fifths as long as the long spur.

Length: 7.7 to 9.2 mm.; breadth, 3.0 to 3.6 mm.

Type.—♂; Ritzville, Washington; March 30, 1921; (M. C. Lane).

Allotype.—♀; same data as type.

Paratypes.—3 ♂, 1 ♀, same data as type. 2 ♀; Washtucna, Washington; May 24, 1920; (M. C. Lane). [Paratypes deposited in collections of U. S. Nat. Mus., and R. C. Casselberry.]

Aphodius rehni new species

This is evidently a high altitude species and should be placed in the *prodromus* group of *Aphodius*. It will not key to this group using Horn's key because of the lack of hair on the upper side. I take pleasure in dedicating this species to Mr. James A. G. Rehn, who was one of the collectors of the paratype.

Moderately elongate, convex; shining, piceous. Pronotum and head black, sides of pronotum yellowish; elytra yellowish with an elongate spot of fuscous on each elytron; legs but little lighter in color than underside.

Clypeus hemihexagonal, broadly and shallowly emarginate with the edges slightly reflexed, angles rounded, sides straight; genae scarcely at all prominent. Punctures on head and clypeus evenly spaced and moderate in size, separated from two to three times their diameter. Sides of thorax parallel, narrower in front; hind angles obtuse but well defined; basal marginal line very fine but entire. Punctures about the same as on the head except near the sides and hind margins where they are slightly larger and closer together.

Elytral humeri obtuse. Striae moderately deep, crenately punctured the punctures rather deep. The intervals are convex and finely, sparsely punctured, the sides of the intervals with a faint alutaceous sculpturing.

Abdomen alutaceous and finely punctured, anterior tibiae tridentate, smooth in front, very vaguely crenate above the third tooth. Spur of anterior tibiae curved and hooked on the end.

Length: 5.0 mm.; breadth, 2.2 mm.

Type.—♂; Summitville, Rio Grande County, Colorado. August 17, 1885, 11,500 ft.

Paratype.—♂; San Francisco Mountains, Arizona. July 31, 1919; 9,000 ft. (Rehn and Hebard; in bull pine forest). [Acad. Nat. Sci. Phila.]

Phyllophaga floridana new species (Text fig. 3-6)

This species runs to the *fusca* group in Horn's key and is allied to *pearliae* Davis. It differs from *pearliae* by its coarser punctures, shape of fixed spur on hind tibiae and genitalia characters.

Oblong, rufotestaceous, fuscous; shining.

Clypeus moderately deeply emarginate, narrowly reflexed, rather densely and coarsely punctate. Front slightly less coarsely punctured.

Thorax nearly evenly and moderately punctured. Side margins slightly crenate, widest at middle, arcuate in front and slightly sinuate behind.

Elytral punctures smaller than those on the thorax. Rugose on the dorsum; costae fairly well defined. Punctures on the pygidium nearly as coarse as on the elytra.

Metasternum moderately and densely punctured; hair is short and sparse, sparser in the female. Abdomen sparsely and finely punctured, the last two segments more coarsely punctured.

Antenna 10-segmented. Tooth of tarsi fairly long, triangular, median.

♂. Antennal club a little longer than the funicle. Abdomen flattened along the middle; penultimate segment with a transverse ridge along each side of the median depression; last segment with a depression in the middle and a ridge along the anterior side. Lower spur of hind tibiae fixed, half the length of the upper and obliquely acute.

♀. Antennal club as long as the funicle. Penultimate segment of abdomen with a transverse depression. Lower spur of hind tibiae movable, two-thirds as long as the upper.

Length: 18 mm., breadth, 9 mm.

Type.—♂; St. Petersburg, Florida.

Allotype.—♀; same data as type.

Paratype.—♂; same data as type; [in collection of R. C. Casselberry].

Phyllophaga duvalus new species (Text fig. 1-2)

This species belongs to Horn's group IX but differs from the members of this group and all other species of Phyllophaga known to the author by its genitalia characters.

Oblong, depressed; rufotestaceous, shining.

Clypeus slightly sinuate at the middle; margin strongly reflexed; punctures moderately deep, separated from one to one and a half times their width, a little sparser medially. On the front the punctures are a little closer laterally than on the clypeus.

Thorax moderately punctured, the punctures a little closer laterally. Sides slightly crenate, widest at the middle; anteriorly barely arcuate, posteriorly slightly narrowed to base, with short ciliae.

Elytral punctures small laterally, larger and rugose dorsally, each puncture bearing a fine inconspicuous yellowish hair. Sutural coastae fairly distinct. First discal, faint; submarginal obsolete.

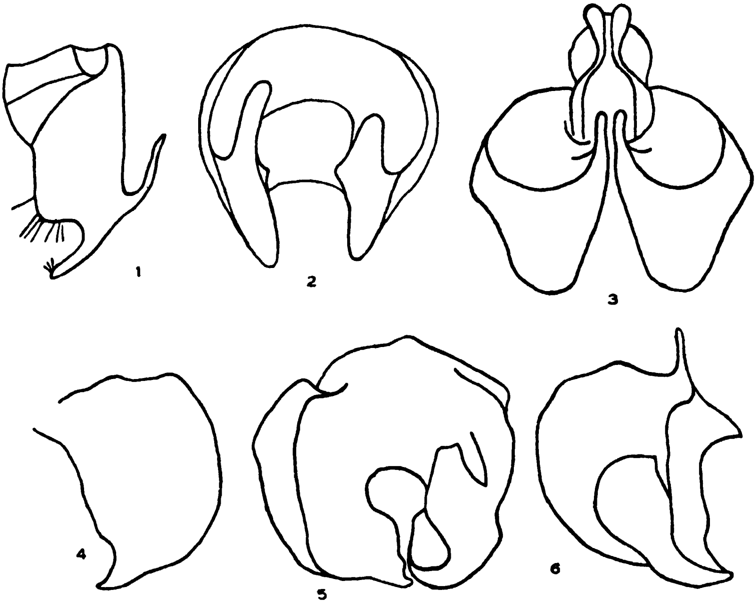

Fig. 1.—*Phyllophaga duvalus*. ♂. Lateral view of left clasper. Fig. 2.—Caudal view of claspers. Fig. 3.—*Phyllophaga floridana*. ♀. Ventral aspect of genitalia. Fig. 4.—*Phyllophaga floridana*. ♂. Lateral view of left clasper. Fig. 5. Caudal view of claspers. Fig. 6.—Lateral view of right clasper and inside of left.

Pygidium evenly convex; punctures along the base a little closer than on the sides of the elytra, rugose near the tip. Metasternum densely and finely punctured, densely hairy. Abdomen sparsely and finely punctured along the sides; the punctures are coarse on the last two segments. Abdomen flattened along the middle; the penultimate segment with a short slightly arcuate ridge along the posterior margin; last segment with a triangular depression.

Antennae ten-segmented; club slightly longer than the stem.

Tooth of claw triangular, median. Lower spur of posterior tibiae fixed three-fifths the length of the upper.

Length: 17 mm.; breadth, 8.5 mm.

Type.—♂, Lake City, Florida; March 5, 1897; [in collection of U. S. Nat. Mus.].

Paratypes.—3 ♂; Monticello, Florida; March 13, 1919; (W. A. Hoffman). Lake City, Florida; Duval County, Florida. One paratype in collection of U. S. Nat. Mus.

Anomala insitiva new species

1906. *Anomala cincta* var. *polychalca* Schaeffer (not Bates, 1888), Journ. N.Y. Ent. Soc., XIV, p. 2.

This is the species mentioned by Schaeffer as being *cincta* var. *polychalca* Bates, but *cincta* is a larger species, 15 mm. long, 8.5 mm. wide, also the punctures on the head, thorax, scutellum and elytra of *insitiva* are much coarser than on *cincta*. The genitalia of the two species are distinctly different. I preserve the name under which it was found in the Schaeffer collection.

Body ovate, very convex; shining, piceous with a metallic green lustre. Clypeus scabrous with the sides parallel and the angles strongly rounded, edges broadly and strongly reflexed. Head scabrous anteriorly; sparsely punctured in the posterior portion.

Prothorax three-fourths as wide as the elytra, trapezoidal, convex; the punctures evenly spaced and moderately deep. Disk is covered with a very fine alutaceous sculpture. Hind margin is interrupted at the middle. Scutellum punctured the same as the pronotum except the margins which are smooth. Elytra parallel, inflated at the middle. Striae moderately coarsely punctured, the second very confusedly near the base. The intervals finely sparsely punctured, the fifth and sixth intervals with a row of coarse punctures.

Pygidium convex; confluently punctured. Metasternum not protuberant. Abdomen sparsely finely punctured.

Larger claw of anterior tarsi cleft, the upper ramus in the male thinner and not quite so long as the lower. In the female the upper ramus is slightly longer than the lower.

Length: 12 mm.; width, 6.5 mm.

Type.—♂; Brownsville, Texas; June 1901.

Allotype.—♀; Esperanza ranch, Brownsville, Texas; July 1.

Paratypes.—4 ♂, 5 ♀; Esperanza ranch, Brownsville, Texas; May, June, July and August; (Charles Schaeffer, J. N. Knull). Edinburg, Texas; (Chittenden). Paratypes deposited in collections of U. S. Nat. Mus., R. C. Casselberry, and O. L. Cartwright.

Aphodius anthracinus LeConte

1878. *Aphodius anthracinus* LeConte, Bull. U. S. Geol. & Geog. Surv., IV, p. 455.
1887. *Aphodius anthracinus* Horn, Trans. Amer. Ent. Soc., XIV, p. 15.

Recently it was my good fortune to examine a series of 31 males and 21 females of *Aphodius anthracinus* Lec. collected by Mr. R. C. Casselberry at Grand Canyon, Yellowstone National Park, Wyoming, on August 7, 1936. These were found mostly in horse droppings.

The males in this series varied in size from 6.4 to 9 mm. long and from 3 to 4.4 mm. wide. The large punctures on the pronotum of the smaller specimens were separated by only three or four times their diameters, on the disk and in these specimens the difference in size of the large and small punctures was not as great as in the large specimens which had practically no coarse punctures on the disk, just a few scattered on the side margins. The side margins of the thorax in some of the specimens were straight in the basal half while in others they were sinuate. The intervals on the elytra varied from being apparently smooth to quite evidently alutaceous. Another feature which I have not seen in print is that the inner or short spur of the middle tibiae has a hook on the end of it.

In the females there was the same extreme in size also the sculpturing of the elytral intervals varied to the same degree as in the males. The punctures on the thorax of the females were not nearly as variable as in the males.

When the two extremes of size were put side to side they looked like two entirely different species, but there were abundant specimens with intergradations of all characters so that this species shows as much or more variation than any species of *Aphodius* which it has been my pleasure to examine.

Phaeocrous behrensii Horn

1867. *Phaeocrous behrensii* Horn, Trans. Amer. Ent. Soc., I, p. 163.

I can find no reference to *Phaeocrous behrensii* in any writings since Horn described it in 1867 from California. In his remarks after the description Horn admits that this species might be an accidental introduction. Comparing the type of *behrensii* with *emarginatus* Cast. I find they are indistinguishable; so Horn's specimen was either an introduction from the East Indies or he was misinformed as to locality. I would like to take this opportunity to designate the specimen in the Horn collection with the name label on it as the lectotype of *behrensii*.

Geotrupes occidentalis Horn

1880. *Geotrupes occidentalis* Horn, Trans. Amer. Ent. Soc., VIII, p. 144.

Dr. Horn described *Geotrupes occidentalis* from Havilah, California. He had before him a unique female given to him by Henry Edwards.

Upon comparing Horn's type with the Japanese species *laevistriatus* Mots. I can find no difference other than a very slight color variation.

It is rather difficult to say at this late time whether Horn's specimen was an accidental introduction or whether it was incorrectly labelled as to locality. No other specimens have turned up in California since the original one so I think the best we can do is to drop this species from our lists.

Phyllophaga rugosiodes Linell

1896. *Phyllophaga rugosiodes* Linell, Proc. U.S. Nat. Mus., XVIII, p. 728.

After comparing a specimen in my collection with Linell's type of *rugosiodes* and Horn's type of *luctuosa* I have come to the conclusion they are both the same species and that Linell's name should be suppressed in favor of Horn's. The only difference I can find is that in Linell's specimen the antennae are nine-jointed and Horn's are ten-jointed, also *rugosiodes* is slightly smaller and lighter in color. The genitalia claspers are identical.

Anomala foraminosa H. Bates

1888. *Anomala foraminosa* Bates, Biol. Centr.-Amer. Col., II, 2, p. 229.

This Mexican species should be added to our lists on the strength of two specimens in the Schaeffer collection collected at Brownsville, Texas.

To our American species it is closely related to *ellipsis* Casey but differs by having the punctures on the thorax coarser and closer, also the clypeus on *ellipsis* is much more heavily punctured.

Strategus arizonicus Schaeffer

1915. *Strategus arizonicus* Schaeffer, Journ. N.Y. Ent. Soc., xxiii, p. 50.

I have in my collection a male and female of this species which I received from the Schaeffer collection and these are undoubtedly the specimens Schaeffer used to draw up his description.

A character which Schaeffer did not mention in his description is that the clypeus is not rugulose as *julianus* Burm. but is distinctly punctured, thus this form approaches *roosevelti* Casey.

I want to take this opportunity to designate the male specimen the lectotype and the female the allotype. Both specimens are from Prescott, Arizona.

In the same publication, p. 51, Schaeffer described *Canthon punctaticollis* from Florida but did not designate a type. I have in my collection Schaeffer's specimen and hereby designate it the type.

STUDIES IN THE NYSSONINE WASPS

IV.[1] NEW OR REDEFINED GENERA OF THE TRIBE NYSSONINI, WITH DESCRIPTIONS OF NEW SPECIES

(HYMENOPTERA: SPHECIDAE)

BY V. S. L. PATE

(Plates VII and VIII)

The Nyssonine wasps have been in a most unsatisfactory state taxonomically for the past fifty years. Since 1796 when Latreille first established the genus *Nysson*, many names have been proposed for generic and subgeneric groups within the *Nysson* and *Gorytes* phratries. The only enlightening piece of work that has appeared on this complex as a whole is Handlirsch's classic monograph,[2] published fifty years ago. Inasmuch as all the relatively recent names proposed for generic or subgeneric groups were so inadequately defined and so poorly understood, Handlirsch adopted the policy of placing all the species of this complex into a few portmanteau genera, dividing each of these up, however, into a number of species groups which often correspond roughly to the genera proposed by earlier and later authors. Recently I have had an opportunity to study the genotypes of practically all these generic names, and offer here a tentative classification of the complex, particularly the genera of the tribe Nyssonini.

Acknowledgments.—This study is based largely upon material in the collections of the Academy of Natural Sciences of Philadelphia. For the loan of material or the privilege of examining the collections in their charge, I wish to express my thanks to Mr. Nathan Banks of the Museum of Comparative Zoology, Mr. Herbert F. Schwarz of the American Museum of Natural History and Miss Grace A. Sandhouse of the United States National Museum. Dr. Joseph Bequaert of the Harvard School of Tropical Medicine has very kindly loaned me material from his own collection; these specimens are now deposited in the Museum of Comparative Zoology at Cambridge. From Dr. May K. Gyger of Perris, California, I have received interesting material and information of that region. Finally, I am particularly indebted to Dr. P. H. Timberlake of Riverside California, for generously sending me valuable material from his own collection and supplying me with much interesting information.

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[1] Pt. I, Trans. Amer. Ent. Soc., LXII, pp. 49-56, (1936). Pt. II, Bull. Brooklyn Ent. Soc., XXXI, pp. 198-200, (1937). Pt. III, Trans. Amer. Ent. Soc., LXIV, pp. 57-77, (1938).

[2] Sitzber. Akad. Wissen. Wien, XCV, pp. 246-421, (1887); XCVII, pp. 316-565, (1888); CIV, pp. 801-1079, (1895).

Two of the species described as new on the following pages are based in part upon material collected by Messrs. James A. G. Rehn, John W. H. Rehn and myself who formed the personnel of the Academy of Natural Sciences of Philadelphia's Southwest Orthoptera Survey of 1937 which was financed by a grant from the American Philosophical Society and the Academy of Natural Sciences of Philadelphia. To these two organizations I wish to acknowledge my indebtedness.

SUBFAMILY NYSSONINAE

The Nyssonines have always been a difficult region in our classification of the Sphecoid wasps. While perhaps not as complete a mystery as certain other series, there has been little agreement as to the content of the group, the manner of subdivision, or the relative importance of the various characters. As understood here, the subfamily comprises a large and protean complex divisible into a number of tribes. They all agree practically without exception, however, in having the mesonotum expanded laterally and more or less overlying the bases of the tegulae. This structure, the importance of which has apparently hitherto been underestimated, I have chosen to call the *mesonotal lamina.* It is frequently squarely or obliquely truncate and declivous posteriorly, and is relatively constant in size, shape and structure throughout groups of related genera. Several of the complexes such as the Gorytini, Alyssonini and Ampulicini possess a vertical suture or suturiform impression running ventrad from below the pronotal tubercles; this is the *omaulus,*[3] or epicnemial groove of certain authors. All the groups have the anal lobe of the hind wing shorter than the submedian cell and the transverse cubital vein situated far beyond the origin of the radial vein, and, save for the Bembicini and one or two aberrant genera in other tribes, all are furnished with two apical spurs on the middle tibiae.

Key to the Tribes of the Subfamily Nyssoninae

1. Fore wings with the basal vein distant from the stigma by two or more times the distance between the apex of the marginal cell and the apex of the wing; last abdominal tergite of males usually divided into three parts, a large trigonal dorsal portion and laterally on each side an elongate triangular part, the lateral lobes inflexed and closely applied to the last abdominal sternite;[4] labrum exserted.................2
Fore wings with the basal vein distant from the stigma by less, generally much less, than twice the distance between the apex of the marginal cell and the apex of the wing; last abdominal tergite simple, not trilobed..3
2. Ocelli distorted, flat; middle tibiae with but one apical spur...*Bembicini*
Ocelli normal, circular and convex; middle tibiae with two apical spurs. *Stizini*
3. Antennae arising from beneath distinct frontal lobes; mesosternum with a distinct transverse carina just before the middle coxae; pronotum long..*Ampulicini*
Antennae not arising from beneath distinct frontal lobes, or if so then the mesosternum is not transversely carinate before the middle coxae..4
4. Pronotum long, subquadrate; hind femora produced apically beneath into a reniform tooth or process which is truncate apically; fore wings with the second submarginal cell petiolate; hind tibiae smooth, weakly spined at most, never serrate or dentate; slender forms....*Alyssonini*
Pronotum short, transverse; hind femora simple apically or if with a truncate reniform tooth or process apically beneath, then the hind tibiae are dentate or serrate on their outer margins and the front has a sharp longitudinal keel medially above the antennal sockets; fore wings with the second submarginal cell sessile or petiolate; usually stouter forms..5

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[3] *Cf.* Trans. Amer. Ent. Soc., LXII, p. 51, (1936). Rohwer was the first to call attention to the taxonomic importance of this character [Connecticut Geol. & Nat. Hist. Surv., Bull. 22, pp. 652 *et seq.*, (1916)].

[4] This feature is not apparent in all genera of the Bembicini. In some of the more specialized groups of this tribe the lateral lobes are reduced, obsolescent or lost secondarily.

5. Dorsal caudolateral angles of the propodeum dentate or spinose (except in *Nippononysson*); fore wings with the second submarginal cell petiolate, or only two submarginal cells present; meso- and metasternum together forming a continuous flat plate overlying the bases of the middle and hind coxae, the mesosternum separated from the metasternum by a transverse suture, the latter plate cleft posteriorly; middle and often also the hind coxae well separated; male genitalia with the volsellae not truncate apically.................*Nyssonini*

 Dorsal caudolateral angles of the propodeum simple, unarmed; fore wings always with three submarginal cells present, the second usually sessile; mesosternum posteriorly with two small oblique laminae which overlie the bases of the middle coxae; metasternum narrow, concave, with a median longitudinal keel, cleft posteriorly and overlying the bases of the hind coxae which are more or less approximate; male genitalia with the volsellae generally truncate apically......*Gorytini*

The Gorytini represent in all probability the most generalized group of the whole complex. From them or their derivatives have arisen all the other assemblies placed here in the subfamily Nyssoninae. Rohwer[5] has divided them into no less than three tribes, *viz.*: the Gorytini, Hoplisini, and Spheciini, but a careful study of the component genera fails to support this proposed division. A generic classification of the Gorytini will be presented shortly in another paper of this same general series.

The Bembicini and Stizini form a compact, closely interrelated group of this general complex, differentiated from the other assemblages by the characteristic venation of the fore wing and the peculiar and interesting structure of the last abdominal tergite of the males. Of recent years, they have usually been placed together in a separate subfamily termed the Bembicinae, or each has been elevated to the rank of a presumably distinct subfamily or even family. However, if we assume that they are closely related, as they indubitably are, and that the Stizini are more or less ancestral to the Bembicini, then they must be regarded as belonging to the Nysonid complex since both possess the mesonotal laminae so characteristic of most of the members of this general group. Furthermore the Stizines undoubtedly have evolved from some ancestral Gorytoid stock such as *Sphecius* or *Tanyoprymnus*.

[5] Proc. U.S. Nat. Mus., LIX, pp. 404; 411-413, (1921).

The Ampulicids have been placed in this general complex only tentatively. They have been variously allocated by different authors, but the structure of the hind wing, the thorax, the head and the legs, and also the abdomen as well indicates they apparently belong with or at least very near the Nyssonids. They seem to be an extremely sidewise specialized group related to the Nyssonid complex through the Alyssonines.

A discussion of the phylogenetic relationships of the various tribes with one another is outside the scope of the present paper. These data will be presented elsewhere at a later date.

Tribe NYSSONINI

The Nyssonini are a compact and natural group somewhat isolated from the other complexes of this family. It is possible that they may have been derived from the same ancestral stock which gave rise to the Alyssonines, but their precise origin is a moot point and so highly problematic that I do not choose to discuss it at the present juncture. The chief differential features of the tribe have been given in the foregoing key. In addition to those characters given on a preceding page which the Nyssoninae as a whole possess, the genera of this tribe have the following features in common.

Tribal Characters.—Compound eyes more or less divergent above, reaching to the bases of the mandibles below; mandibles simple apically, entire beneath, edentate within; mesonotal laminae usually squarely truncate posteriorly and vertically declivous there; mesopleura with the omauli, the sternauli, and the episternal and episternaulal sutures or furrows generally obsolete; metapleura and the lateral faces of the propodeum ankylosed for the most part; dorsal caudolateral angles of the propodeum dentate or spinose except in *Nippononysson;* fore wing with the second submarginal cell petiolate, or only two apparent submarginal cells present, the stigma small except in *Nippononysson;* mesosternum and metasternum together forming a continuous flat plate overlying the bases of the middle and hind coxae, the mesosternal plate separated from the metasternal one by a transverse suture, the latter plate cleft posteriorly; the middle and often also the hind coxae well separated; middle tibiae with two apical spurs save in the males of the subgenus *Cresson;* last segment of the tarsi small, not swollen, the pulvilli small (absent in *Perisson*) except in *Brachystegus* Costa; claws small, simple, edentate; abdomen always with seven clearly visible tergites in the male and six in the female; male genitalia with the volsellae not truncate apically.

Remarks.—For the past half century the genera of the Nyssonini have been in a most unsatisfactory state from a systematic standpoint. Various generic names in this complex have been proposed from time to time by Smith, Ashmead and others, but the generic concepts of these authors seem to have been very imperfectly understood and most writers have merely followed the practice of placing all the species of this tribe in the blanket genus *Nysson.* In 1921 Rohwer endeavoured to bring some order out of the existing confusion.[6] His attempt was relatively successful. He considered the various genera that had been established merely as subgenera of *Nysson,* and in addition proposed *Zanysson* as a new subgenus to replace *Paranysson* Auctt., *nec* Guérin, 1844, a fact which had been pointed out by Turner seven years earlier.[7] However, Rohwer's material of this group appears to have been somewhat limited, for an intensive study of more extensive material coupled with an examination and comparison of practically all the genotypes has convinced me that the various groups which he considered, tentatively it is true, as merely subgenera, possess congeries of basic morphological characters than entitle them to be accorded generic status.

Phylogenetic Arrangement of Genera. — Any attempt at a phylogenetic arrangement of the genera and subgenera of the Nyssonini at the present time must be regarded as purely tentative. The data now available, however, indicate that the subgenus *Nysson* is without question the most primitive and generalized group of those into which the tribe is here divided. From the neighborhood of this generalized type have issued two major lines of development, but in either case the first modification of the ancestral type is the shifting of the cubitus of the hind wing from a position interstitial or before the transverse median vein to a point distinctly beyond it.

One major line of development is palmate in character and embraces a diverse and ill assorted assembly of genera and subgenera—*Hyponysson, Epinysson, Foxia, Cresson* and *Perisson*—that have as practically their sole feature in common simple unarmed hind tibiae and femora. Of these *Hyponysson* and

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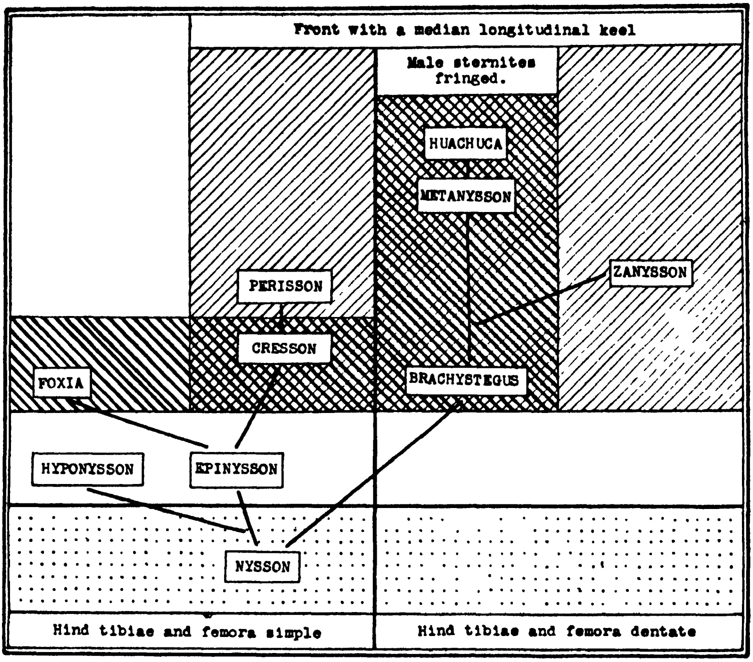
[6] Proc. U. S. Nat. Mus., LIX, pp. 403-413, (1921).

[7] Ann. & Mag. Nat. Hist., (8), XIV, pp. 338-340, (1914).

Epinysson, both of which probably had a common ancestor, are obviously the closest relatives of *Nysson*. The former of these two diverged quite early from the evolutionary line of the latter and, so far as known at present, has given rise to no other group, whereas from some such ancestral stock as *Epinysson* have evolved *Cresson* and *Foxia*, though each has pursued its own line of development and has little in common with the other save the same type of venation in the hind wing and the simple hind femora and tibiae.

The most distinctive line of development by far comprises the closely knit *Brachystegus-Zanysson-Metanysson* complex, characterized principally by the serrate to dentate hind tibiae, the toothed hind femora and the keeled front. The last of these three genera represents the extreme development along this line, or for that matter the tribe as a whole, with *Zanysson* occupying a position intermediate between it and the relatively generalized *Brachystegus* which has probably originated from the vicinity of some such complex as the Aequalis Group of *Nysson* in the restricted sense.

The accompanying figure represents an attempt to portray graphically the probable evolutionary trends of the various genera and subgenera of the Nyssonini. The dotted area below the first horizontal line indicates the type of venation of the hind wing—cubitus arising before or interstitial with the transverse median vein, whereas in the undotted region above, the cubitus arises beyond, usually far beyond, the transverse median nervure. The groups to the left of the median vertical line have the hind femora and tibiae simple; those to the right are furnished with serrulate to dentate hind tibiae and dentate hind femora. The right oblique shading indicates those genera and subgenera in which the front is provided with a median longitudinal keel, while the left oblique shading shows those whose males possess medio-apical fringes of long white hair on the second to fifth abdominal sternites. There are numerous additional characters that might have been utilized in the construction of this figure but those chosen apparently serve to portray best the probable evolutionary trends of the general complex. These additional features will be found in the keys, characterizations and discussions of the individual genera and subgenera on the following pages. I have seen no material of *Acanthostethus* Smith nor *Nippononysson* Yasumatsu & Maidl and consequently am unable to fit them into the picture at present.



Probable evolutionary trends of the genera and subgenera of the Nyssonini.

Ethology.—The Nyssonini are inquilines or cleptobionts in the nests of other fossorial wasps. In the past they have been regarded as parasitic exclusively upon their near relatives the Gorytini, but recently I had the pleasure of seeing some coloured motion pictures of insects taken in the vicinity of New York City by Dr. A. L. Melander of the College of the City of New York, in which a *Nysson*, possibly *N. basilaris* or *N. hoplisivora*, was observed entering the burrow of the Sphecine, *Chlorion (Ammobia) ichneumoneum* (L.). Moreover, Ham and Richards[11] have stated that *Nysson dimidiatus* Jurine has been seen a number of times about the burrow of the Crabronine, *Lindenius* *albilabris* (F.), at Oxford, England. Consequently despite Bequaert's assertions to the contrary,[8] I believe it is not improbable that the members of this group may be parasitic upon many groups of fossorial wasps and bees that nest in sandy situations. Reinhard[9] has given an excellent account of the habits of *Nysson* (*Epinysson*) *hoplisivora* Rohwer, while Bequaert[10] and Hamm and Richards[11] have summarized very ably the various accounts of the biology of the members of this group.

Key to the Genera of Nyssonini[12]

1. Hind tibiae dentate, serrate, or serrulate; hind femora armed apically beneath with a truncate, subreniform dentate process or tooth; front just above the antennae provided with a median longitudinal keel or tubercle which is often cristate....................................2

   Hind tibiae unarmed save for occasional weak spines; hind femora simple apically, without a truncate subreniform tooth apically beneath; front with or without a cristate median longitudinal keel or tubercle..4

2. Postscutellum bilobed; hind tibiae with more than four teeth; male pygidium usually with four or more teeth; abdominal sternites of males without long fringes of white hair medio-apically; fore wings with three submarginal cells present; (New World forms).

   Zanysson Rohwer

   Postscutellum simple, or at most spinose; hind tibiae with only four teeth or irregularly serrulate; abdominal sternites two to five of the males with long fringes of hair medio-apically......................3

3. Fore wing with three submarginal cells; hind tibiae irregularly serrate or serrulate; postscutellum simple; last abdominal tergite of female not meeting on the midventral line, the corresponding sternite thus not enclosed and concealed; (Old World forms).

   Brachystegus A. Costa

   Fore wings with only two submarginal cells due to the atrophy of the first ordinate (*i.e.* the free portion) of the first transverse cubital vein; hind tibiae quadridentate; last abdominal tergite of female meeting on the midventral line and thus concealing the corresponding sternite; (New World forms[13])...............*Metanysson* Ashmead

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[8] Ent. News, XLIV, p. 38, footnote 4, (1933).

[9] Journ. Washington Acad. Sci., XV, pp. 172-177, (1925); *v. et.*: Witchery of Wasps, Chapt. XIII, pp. 261 *et seq.*, (1929).

[10] Ent. News, XLIV, pp. 37-39, (1933).

[11] Trans. Ent. Soc. London, 1930, pp. 103-104, (1930).

[12] Exclusive of the Australian forms.

[13] With the possible exception of Australia. *Cf.* discussion of this point under *Metanysson.*

4. Dorsal caudolateral angles of the propodeum simple, rounded, not dentate; stigma large; fore wings with but two submarginal cells, the second sessile, each submarginal cell receiving a recurrent vein; hind wings with the cubitus arising distinctly beyond the transverse median vein; (Japanese forms)..........*Nippononysson* Yasumatsu & Maidl

   Dorsal caudolateral angles of the propodeum distinctly dentate; stigma small or mediocre in size; fore wings with three or two submarginal cells, the second always petiolate and when only two submarginal cells are present receiving both recurrent veins....................5

5. Fore wings with the second recurrent vein received by the third submarginal cell; antennae apparently 12-segmented in both sexes and arising from simple round sockets with reflexed rims, not from beneath frontal lobes or ridges; scapal area of front more or less concave, occasionally armed with a small median tubercle; second to penult abdominal sternites dentate or spinose latero-apically on each side; males with the second to fifth sternites with long fringes of white hair medio-apically; (New World forms)...........*Foxia* Ashmead

   Fore wings with the second submarginal cell receiving both recurrent veins; antennae distinctly 13-segmented in the males and 12-segmented in the females and arising from beneath distinct frontal lobes; scapal area of front convex and with or without a median longitudinal cristate keel..6

6. Front armed medially above the antennae with a sharp cristate keel or carina which forks above and is thus V- or Y-shaped; both sexes without a pygidium; last abdominal tergite multidentate; females with a tarsal comb on the fore tarsi; (Neotropical forms).
   Cresson new genus

   Front simple or unarmed, convex or tumid; a distinct pygidium present, at least in the females; males without medio-apical fringes of hair on the second to fifth sternites and with the pygidium usually bidentate at most; abdominal tergites and sternites not dentate or spinose latero-apically; females without a tarsal comb on fore tarsi, or if such is present, it is vestigial; (Cosmopolitan forms).
   Nysson Latreille

Inasmuch as within recent years no attempt save Rohwer's[14] has been made to define or delimit the super-specific groups of the Nyssonini, I have given characterizations of what I believe are the natural generic and subgeneric entities of this complex with the exception of the Australian forms. I have seen very little Nyssonid material from that region, the species of which I know chiefly from the mere and often meagre descriptions of Smith and Turner. At present all the Australian species are referred to Smith's genus *Acanthostethus,* but I suspect that when a careful study of the Nyssonid fauna of this region is made it will be necessary to allocate the various forms to more than one genus. In addition to the generic definitions, synopses of *Hyponysson, Foxia* and *Metanysson* are presented on the ensuing pages, as well as descriptions of new species of the genera *Nysson* and *Zanysson.* Revisions of these two latter genera are reserved for treatment in later papers of this same general series.

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[14] Proc. U. S. Nat. Mus., LIX, pp. 403-411, (1921).

NYSSON Latreille[15]

Nysso Latreille,[16] Prec. Char. Gen. Insect., p. 125, (1796).

Nysson Latreille, Hist. Nat. Crust. Insect., III, p. 340, (1802).—Cresson, Trans. Amer. Ent. Soc., IX, p. 275, (1882).—Handlirsch, [in part], Sitzber. Akad. Wissen. Wien, XCV, p. 281, (1887).—Cresson, Trans. Amer. Ent. Soc., XIV, Suppl., pp. 117 & 280, (1887).—Cameron [in part], Biol. Centr.-Amer., Hymen., II, p. 71, (1890).—Fox [in part], Proc. Acad. Nat. Sci. Phila., XLVI, p. 302, (1894).—Fox [in part], Journ. N. Y. Ent. Soc., IV, p. 10, (1896).—Kohl [in part], Ann. K. K. Naturhist. Hofmus. Wien, XI, p. 394, (1896).—Ashmead, Canad. Entom., XXXI, p. 326, (1899).—H. S. Smith, Univ. Nebraska Stud., VIII, p. 339, (1908).—Patton [in part], Ohio Nat., IX, p. 442, (1909).—Viereck [in part] (in Smith), Ann. Rept. New Jersey State Mus., 1909, p. 680, (1911).—Rohwer, Connecticut Geol. & Nat. Hist. Surv. Bull. 22, p. 655, (1916).—Mickel, Univ. Nebraska Stud., XVII, p. 349, (1918).—Rohwer [in part], Proc. U. S. Nat. Mus., LIX, p. 404, (1921).—Bradley (in Leonard), Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1016, (1928).—Pate, Mem. Amer. Ent. Soc., no. 9, pp. 44, 75, 86, (1937).

Nyssonus Rafinesque, Analyse de la Nature, p. 124, (1815).

GENOTYPE: *Crabro spinosus* Fabricius, 1775 [=*Sphex spinosa* Forster, 1771=*Nysson spinosus* (Forster) =*Nysson* (*Nysson*) *spinosus* (Forster)]. (By designation of Shuckard, 1837, Essay Indig. Foss. Hymen., p. 99.[17])

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[15] A complete bibliographic history of the name *Nysson* up until the year 1887 may be found by consulting Handlirsch's monograph: [Sitzber. Akad. Wissen. Wien, XCV, p. 281, (1887)]. No attempt has been made in the following nomenclatorial citations to include the voluminous old world literature.

[16] *Cf.* Mem. Amer. Ent. Soc., No. 9, p. 44, (1937).

[17] Recently Richards [1937, The Generic Names of the British Insects . . . , pt. 5, p. 134] has incorrectly accredited Latreille with fixing the type of *Nysson* in 1810. *Cf.* remarks on this subject in Mem. Amer. Ent. Soc., no. 9, p. 86, (1937).

The simple character of the hind femora and tibiae, the non-tuberculate front, the relatively unspecialized wing venation, and the generalized character of the abdominal sternites and genitalia of the male sex indicate that this, the type genus of the tribe, is without question the most generalized group of the Nyssonine complex. The chief differential features of *Nysson* are given in the key to genera on a preceding page.

Generic Characters.—Head subcircular in anterior aspect, the vertex convex, more or less arched; antennae usually filiform, occasionally subclavate apically, 13—segmented in the males and 12-segmented in the females, the antennal insertions overhung medially above by small frontal lobes; front tumid discally, simple and without a median longitudinal cristate keel or carina.

Thorax with the scutellum either margined or not margined laterally, the anterior lateral corners occasionally with foveae; postscutellum simple; mesopleura with or without an epicnemium anteriorly and simple, not armed with a tubercle, spine or auriculate carina dorsally beneath the tegulae; metapleura and lateral faces of the propodeum usually ankylosed.

Legs with the hind femora simple apically, without a truncate subreniform dentoid process beneath; hind tibiae with posterior margins unarmed, never dentate, serrate, or serrulate, but weakly spined at most; fore tarsi of the females usually lacking even the vestiges of a tarsal comb.

Wings with the second submarginal cell of the fore wing always petiolate and receiving both recurrent veins, either with three submarginal cells as in *Nysson* (*s. str.*) and *Epinysson* or only two, the third·transverse cubital vein having atrophied, as in *Hyponysson*. Hind wings with the cubitus arising before, interstitial with, or beyond the transverse median vein.

Abdomen with little or no constriction between the first and second segments; tergites and sternites either simple or double apically but usually not heavily nor coarsely fimbriate there; males without medio-apical fringes of long white hair on sternites; last tergite of females not meeting on mid-ventral line, the corresponding sternite thus clearly visible; both sexes usually with a distinct pygidium, trigonal in the female with the lateral margins simple and not serrulate, and quadrate or rectangular in the males with the apex usually bidentate.

Subgenera.—The present division of the genus *Nysson* into subgenera is a rather unsatisfactory one but I have followed the usual custom of separating it into three groups, *viz.*: *Nysson* (*s. str.*), *Epinysson* (olim *Brachystegus* Auctt., *nec* Costa), and *Hyponysson* on the basis of the wing venation. A more natural division of *Nysson* might be effected by basing the separation into subgenera upon the structure of the apical margins of the abdominal tergites and sternites, *i. e.* whether they are simple as in *N.* (*Nysson*) *lateralis* Packard and *Nysson* (*Hyponysson*) *bicolor* Cresson, or double as in *Nysson* (*Epinysson*) *basilaris* Cresson. In this case, however, the name *Synneurus* Costa may have to be used for the group defined here as *Epinysson,* but inasmuch as I have been unable up to the present time to study any material of *Synneurus procerus* A. Costa, 1859 [=*Nysson epeoliformis* Smith, 1856], the type of *Synneurus,* I have refrained from following this course for the time being. The several subgenera of *Nysson* may be separated by means of the following key.

Key to the Subgenera of Nysson

1. Hind wings with the cubitus arising before or interstitial or nearly so with the transverse median vein....................*Nysson* Latreille
   Hind wings with the cubitus arising distinctly beyond the transverse median vein...2
2. Fore wings with only two submarginal cells present, the third transverse cubital vein atrophied.........................*Hyponysson* Cresson
   Fore wings with three submarginal cells present, the third transverse cubital vein present.................................*Epinysson* Pate

Subgenus **NYSSON** Latreille

Nysso Latreille, Prec. Charac. Gen. Insect., p. 125, (1796).
Nysson Latreille, Hist. Nat. Crust. Insect., III, p. 340, (1802).
Synneurus A. Costa, Faun. Regn. Napoli, Imen. Acul., Nissonid., p. 16, (1859).
Nysson (*Nysson*) Rohwer, Proc. U.S. Nat. Mus., LIX, p. 404, (1921).—Bradley (in Leonard), Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1016, (1928).—Pate, Mem. Amer. Ent. Soc., no. 9, p. 44, (1937).

GENOTYPE: *Crabro spinosus* Fabricius, 1775 [=*Sphex spinosa* Forster, 1771=*Nysson* (*Nysson*) *spinosus* (Forster)].

The nomenclatorial history of this group is essentially the same as that given under the genus and consequently has not been given in full here.

In a subgeneric sense the name *Nysson* is restricted to that group of species containing the genotype *Nysson spinosus* (Forster), and agreeing with it in having the cubitus of the hind wing arise before or interstitial with the transverse median nervure and the fore wing with three submarginal cells, the second always petiolate and receiving both recurrent veins. This subgenus is without question the most generalized group of the whole tribe.

Distribution.—The subgenus *Nysson* is primarily holarctic in distribution although there are a few species which are referable to it in the Aethiopian and Oriental regions. So far as known it is entirely absent from the Australian and Neotropical areas.

Species of Subgenus.—As understood here, the subgenus *Nysson* comprises the Spinosus,[18] Epeoliformis,[19] Plagiatus,[20] Aurinotus,[21] Trimaculatus, [22] Militaris,[23] Maculatus,[24] Tridens,[25] and Dimidiatus [26] Groups [27] of Handlirsch. Up to the present time twenty-one species which are referable to this subgenus have been recorded from the nearctic region. Two of these are homonyms and are renamed below. A revision of the forms comprising this genus and subgenus will be presented in another paper of this same general series.

Nysson (Nysson) kaskaskia new name

Nysson (*Nysson*) *minimus* Rohwer, Proc. U.S. Nat. Mus., LIX, p. 408, (1921), (*nec* Turner, 1915). [♀; St. Louis, Missouri.]

Rohwer's specific name is a homonym of *Nysson* (*Acanthostethus*) *minimus* Turner, 1915 [28] and I consequently propose here *Nysson kaskaskia* in lieu of it.

Nysson (Nysson) melanopus new name

Nysson nigripes Provancher, Add. Faun. Ent. Canad., II, Hymen., p. 269, (1889), (*nec* Spinola, 1808). [♂; Hull, Quebec.]

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[18] Sitzber. Akad. Wissen. Wien, xcv, p. 337, (1887).

[19] Sitzber. Akad. Wissen. Wien, xcv, p. 344, (1887).

[20] Sitzber. Akad. Wissen. Wien, xcv, p. 348, (1887).

[21] Sitzber. Akad. Wissen. Wien, xcv, p. 353, (1887).

[22] Sitzber. Akad. Wissen. Wien, xcv, p. 366, (1887).

[23] Sitzber. Akad. Wissen. Wien, xcv, p. 371, (1887).

[24] Sitzber. Akad. Wissen. Wien, xcv, p. 376, (1887).

[25] Sitzber. Akad. Wissen. Wien, xcv, p. 379, (1887).

[26] With the exception of *Nysson quadriguttatus* Spinola and *N. Gerstäckeri* Handlirsch which are referable to *Epinysson.*

[27] Sitzber. Akad. Wissen. Wien, xcv, p. 386, (1887).

[28] Ann. & Mag. Nat. Hist., (8), xv, p. 83, (1915).

Provancher's specific name is a homonym of *Nysson nigripes* Spinola, 1808 [29] and I therefore propose here *Nysson melanopus* in lieu of it.

Subgenus **HYPONYSSON** Cresson

Hyponysson Cresson, Trans. Amer. Ent. Soc., IX, pp. 273 & 284, (1882).—Cresson, Trans. Amer. Ent. Soc., XIV, Suppl., pp. 117 & 280, (1887).—Ashmead, Canad. Entom., XXXI, p. 327, (1899).

Nysson [in part] Handlirsch, Sitzber. Akad. Wissen. Wien, XCV, p. 281, (1887).—Fox, Proc. Acad. Nat. Sci. Phila., XLVI, p. 303, (1894).—Fox, Journ. N. Y. Ent. Soc., IV, p. 10, (1896).—Kohl, Ann. K. K. Naturhist. Hofmus. Wien, XI, p. 394, (1896).—Patton, Ohio Nat., IX, p. 442, (1909).

Nysson (*Hyponysson*) Rohwer, Proc. U. S. Nat. Mus., LIX, p. 404, (1921).—Pate, Mem. Amer. Ent. Soc., no. 9, p. 32, (1937).

GENOTYPE: *Hyponysson bicolor* Cresson, 1882 [=*Nysson* (*Hyponysson*) *bicolor* Cresson]. (Monobasic.)

The subgenus *Hyponysson* can be readily distinguished from all other groups of the Nyssonids by the characteristic venation of the fore wings. Like *Metanysson*, *Nippononysson* and *Acanthostethus* there are only two submarginal cells in the fore wing but unlike those genera the third rather than the first transverse cubital vein has atrophied, leaving the second submarginal cell distinctly petiolate and receiving both the recurrent veins.

Subgeneric Characters.—In addition to the features given in the foregoing characterization of the genus *Nysson*, the fore wings have only two submarginal cells, the second petiolate and receiving both recurrent veins, the third transverse cubital vein atrophied; hind wings with the cubitus arising distinctly beyond the transverse median vein; last flagellar article of males simple, not truncate apically nor excavate beneath; ocellar area not tuberculate; scutellum without reflexed lateral margins and anteriorly with a small transverse trigonal non-pubescent fovea at each anterior lateral corner; mesopleura with a weak epicnemium anteriorly; propodeal spines weak; abdominal segments simple apically, not doubly margined nor provided with fimbriae there; both sexes with a distinct pygidial area, that of the female trigonal with apex rounded, that of male quadrate or retangular; body with integument usually subtilely punctured.

Remarks.—If any difference exists between a genus and subgenus other than one of degree, this difference is certainly that of the nomenclature employed. The name of the genus and subgenus must appear in combination with that of the species. It is therefore very regrettable that in Cresson's paper on the genus *Nysson* in which he indicates various " subgenera ", one of which is *Hyponysson,* the inconsistency of omitting the generic name in combination with the subgenus and species should appear.[30] Notwithstanding Cresson's statement that the present group was to be considered a subgenus, the form he employed indicates he adopted *Hyponysson* as a genus and must be so cited. Indeed, five years later in 1887 when Cresson published his classic " Synopsis of the Hymenoptera of America "[31] he apparently regarded the group without question as worthy of generic rank, and was followed in this by Ashmead when the latter did his classification of the Sphecoid wasps twelve years later.[32]

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[29] Insect. Ligur., II, p. 45, (1808).

Certain authors such as Fox[33] and Patton[34] have questioned the validity or desirability of retaining *Hyponysson* as a separate group yet despite their comments to the contrary I feel that it is discrete and worthy of being accorded at least subgeneric status. I have seen the types, as well as additional material, of both the described species and have found the diagnostic characters which are largely venational quite constant and supported by certain other structural features as indicated above in the characterization of the subgenus. The group is apparently an offshoot of *Nysson* in the restricted sense.

Distribution.—The subgenus *Hyponysson* is a precinctive group restricted to the Nearctic region. One species, *bicolor,* is transcordilleran, confined to interior Washington and the coastal region of that state and northern California on the basis of the data now at hand, while *raui,* the only other form known at present, is centered in the Mississippi valley, ranging through the Austroriparian and Carolinian zones of east-central Texas (Lee County), northward through Oklahoma, Arkansas, and western Tennessee to east-central Missouri (St. Louis County).

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[30] Trans. Amer. Ent. Soc., IX, pp. 273 & 284, (1882).

[31] Trans. Amer. Ent. Soc., XIV, Suppl., pp. 117 & 280, (1887).

[32] Canad. Entom., XXXI, p. 327, (1899).

[33] Proc. Acad. Nat. Sci. Phila., XLVI, p. 304, (1894).

[34] Ohio Naturalist, IX, pp. 442-443, (1909).

Species of Subgenus.—The species known to me that are referable to this group are *N. bicolor* Cresson and *N. raui* Rohwer. Hitherto the species of this subgenus have been known only from the female sex but I have before me now material of what I believe to be the male of *raui* and which is described on a following page. The females may be separated by the following key.

Key to the Females of Hyponysson

Abdomen entirely red; pygidium with fine, separated acupuncturation; dorsal surface of pronotum with fine, transverse, irregular, clathrate areoles; (Washington and California)....................*bicolor* Cresson

Abdomen red and black; pygidium more coarsely and closely punctate, semistriate longitudinally; dorsal surface of pronotum simply and finely punctate; (Mississippi valley, Texas to Missouri).........*raui* Rohwer

Nysson (Hyponysson) bicolor Cresson

Hyponysson bicolor Cresson, Trans. Amer. Ent. Soc., IX, p. 284, (1882); [♀; Washington Territory].—Cresson, Trans. Amer. Ent. Soc., XIV, Suppl., p. 280, (1887).—Ashmead, Canad. Entom., XXXI, p. 329, (1899).—Cresson, Mem. Amer. Ent. Soc., no. 1, p. 98, (1916).

Nysson bicolor Handlirsch, Sitzber. Akad. Wissen. Wien, XCV, p. 402, (1887); [♀].—Fox, Journ. N.Y. Ent. Soc., IV, p. 16, (1896); [♀].—Dalla Torre, Catal. Hymen., VIII, p. 568, (1897).

Nysson (Hyponysson) bicolor Fox, Proc. Acad. Nat. Sci. Phila., XLVI, p. 304, (1894).—Pate, Mem. Amer. Ent. Soc., no. 9, p. 32, (1937).

Type.—♀; W[ashington] T[erritory]; (Morrison); (no other data); [Academy of Natural Sciences of Philadelphia, Type no. 2038].

This rare west coast form is still known only in the female sex. It may be separated from its Mississippi valley congener by the characters given in the foregoing key on a preceding page.

Specimens examined: 2 females.

WASHINGTON: 1♀; W[ashington] T[erritory]; (Morrison); (no other data); [*type*, A.N.S.P.].

CALIFORNIA: 1♀, Pepperwood, Eel River, Humboldt County, June 28, 1907, (J. C. Bradley); [Cornell].

Nysson (Hyponysson) raui Rohwer (Pl. VIII, fig. 23.)

Nysson (Hyponysson) raui Rohwer, Proc. U.S. Nat. Mus., LIII, p. 176, (1917). [♀; St. Louis, Missouri.]

Type.—♀; St. Louis, Missouri, (Phil Rau), [United States National Museum, Cat. no. 21406].

The chief differential features separating the present species from its west coast relative *bicolor,* the only other species of *Hyponysson* as yet known, have been given in the foregoing key. Prior to the present time *raui* has been known only from the unique female described by Rohwer, but there is now before me additional material of the species among which are representatives of the hitherto unrecorded male sex which is described herewith.

Allotype.—♂; Lewisville, Lafayette County, June 2, 1918, (J. C. Bradley), [Cornell University].

Male.—4.5 mm. long. Black; mandibles except apices which are red, femora apically, fore tibiae and tarsi, tegulae and axillary sclerites, fulvous; all femora and hind tibiae, antennae and abdominal segments (except first which is brownish ferruginous), dark brown; pronotal tubercles and first three abdominal tergites with a latero-apical spot, whitish yellow. Wings hyaline, veins dark brown.

Head, thorax and abdomen clothed with a somewhat inconspicuous, fine, appressed, silvery puberulent pile most noticeable on clypeus, hind tibiae, and apical margins of abdominal tergites.

Head, thorax and abdomen shining and generally subtilely punctured.

Head with clypeus transversely fusiform, about twice as broad as long, tumid discally, apical margin gently arcuate, depressed, subnitidous, and provided medio-apically with a short, narrow, transverse, nitidous flange; front tumid; ocellar area not tuberculate, the ocellocular line about one and one-half times the length of the postocellar line; temporal carinae absent; no spines or tubercles in gular region; antennae short, extending about to tegulae, scape short, obcuneate, pedicel subglobose, flagellum somewhat thickened apically, last article simple, not excavate beneath or otherwise modified.

Thorax with the pronotum simply and subtilely punctured throughout, anterior dorsal margin not transversely carinate, lateral angles rounded, not dentate; scutellum subopaque, not margined laterally; postscutellum opaque, simple; mesopleura subopaque, more closely punctate than elsewhere on body, anteriorly with a weak epicnemium. Dorsal face of propodeum opaque, discally with a median trapeziform area irregularly areolated, laterad of which to bases of the small inconspicuous, acute propodeal spines granulose to finely rugulose; posterior face opaque, the surface generally finely rugulose and discally with a median cuneate areole. Hind tibiae strongly incrassate apically.

Abdomen with the apical margins of the segments simple; pygidium subquadrate, the disc biserially punctate, bidentate apically, the apical margin between the teeth obtusely angulate caudad.

Distribution. — The present species is widely distributed throughout the Carolinian and Austroriparian zones of the Mississippi valley, ranging in the north from east central Missouri southward through Tennessee, Arkansas and Oklahoma to east central Texas (Lee county).

Specimens examined: 6; 4 females, 2 males.

MISSOURI: 1♀, St. Louis, (Phil Rau), [*type*, U. S. N. M.].

TENNESSEE: 1♀, Memphis, Shelby County, June 4, 1915, [A.N.S.P.].

ARKANSAS: 2♂, Lewisville, Lafayette County, June 2, 1918, (J. C. Bradley), [Cornell].

OKLAHOMA: 1♀, Waurika, Jefferson County, July 4, 1937, (J. Standish & R. W. Kaiser).

TEXAS: 1♀, Fedor, Lee County, August 15, 1905, (Birkman), [Mus. Comp. Zool.].

Subgenus **EPINYSSON** Pate

Nysson [in part] Cresson, Trans. Amer. Ent. Soc., IX, p. 275, (1882).—Cresson, Trans. Amer. Ent. Soc., XIV, Suppl., pp. 117 & 280, (1887).—Handlirsch, Sitzber. Akad. Wissen. Wien, XCV, p. 281, (1887).—Cameron, Biol. Centr.-Amer., Hymen., II, p. 71, (1890).—Fox, Proc. Acad. Nat. Sci. Phila., XLVI, p. 302, (1894).—Fox, Journ. N. Y. Ent. Soc., IV, p. 10, (1896).—Viereck (in Smith), Ann. Rept. New Jersey State Mus., 1909, p. 680, (1911).—Herbst, Cat. Apid., Cat. Sphegid. Pompilid.,[35] (1921).

Brachystegus [*nec* A. Costa] Ashmead, Canad. Entom., XXXI, p. 326, (1899).—H. S. Smith, Univ. Nebraska Stud., VIII, p. 338, (1908).—Mickel, Univ. Nebraska Stud., XVII, p. 351, (1918).

Nysson (*Bathystegus* [sic]) Rohwer, Proc. U. S. Nat. Mus., XLIX, p. 247, (1915).—Wolcott, Journ. Dept. Agr. Porto Rico, VII, p. 43, (1923).—Wolcott, Journ. Agr. Univ. Puerto Rico, XX, p. 556, (1936).

Nysson (*Brachystegus*) [*nec* A. Costa] Bradley, Trans. Amer. Ent. Soc., XLVI, p. 122, (1920).—Rohwer, Proc. U. S. Nat. Mus., LIX, p. 404, (1921).—Bradley (in Leonard), Cornell Univ. Agr. Exp. Sta. Mem. 101, p. 1016, (1928).

Nysson (*Epinysson*) Pate, Ent. News, XLVI, p. 250, (1935).—Pate, Mem. Amer. Ent. Soc., no. 9, p. 26, (1937).

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[35] I have been unable as yet to consult this rare and privately printed work on the Chilean Hymenoptera.

GENOTYPE: *Nysson basilaris* Cresson, 1882[36] [=*Nysson* (*Epinysson*) *basilaris* Cresson]. (By original designation.)

To this subgenus I refer at present all those species of *Nysson* in which the cubitus of the hind wing arises distinctly beyond the transverse median nervure and which have three submarginal cells in the fore wing with the second submarginal cell always petiolate and receiving both recurrent veins.

This group is a critical one in the phylogenetic history of the Nyssonids, for from it or more probably from stock ancestral to it have arisen many of the various other genera of the tribe.

Distribution.—As in *Nysson* in the restricted sense, this subgenus is primarily holarctic in distribution, but unlike that group *Epinysson* is well developed in the Neogaeic realm. There are a few representatives of *Epinysson* in the Oriental region but it is apparently entirely absent from the Aethiopian and Australian areas.

Nomenclatorial History.—This is the group which authors have usually called *Brachystegus*. As I have indicated elsewhere,[37] this has been a misapplication of the name; *Brachystegus* A. Costa is an entirely old world group related to the new world genus *Zanysson*, and for *Brachystegus* Auctt., *nec* Costa I therefore proposed recently the name *Epinysson* with *Nysson basilaris* Cresson as type. However, as I have pointed out in my paper on the generic names of the Sphecoid wasps,[38] some question may arise as to whether this is the correct name for the group. Rohwer in 1915 described a *Nysson* (*Bathystegus* [sic]) *basirufus* (*nec* Brèthes, 1913)[39] from Puerto Rico which is strictly congeneric with *Nysson* (*Epinysson*) *basilaris* Cresson. Some may contend, therefore, that it will be necessary to use the name *Bathystegus* rather than *Epinysson* for this subgenus. However, *Bathystegus* is an obvious typographical error or *lapsus calami* for *Brachystegus* Auctt., which Rohwer has consistently used before and since as the name for this subgenus of *Nysson*. Inasmuch as Rohwer has never given any indication he was aware of this situation, I do not propose to regard or to adopt this misspelling as the valid proposal of a new name, particularly in view of the fact that his papers are replete with typographical errors or *lapsus calami* of this sort.

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[36] This species is regarded by certain authors as a synonym or at most as but a subspecies of *Nysson opulentus* Gerstaecker, 1866. Until I have an opportunity to examine Gerstaecker's type I prefer to consider them separate species.

[37] Ent. News, XLVI, p. 250, (1935).

[38] Mem. Amer. Ent. Soc., no. 9, p. 12, (1937).

[39] Proc. U. S. Nat. Mus., XLIX, p. 247, (1915).

Species of Subgenus.—The subgenus *Epinysson* comprises the Opulentus,[40] Tuberculatus,[41] Tomentosus[42] Groups and *Nysson Gerstäckeri* Handlirsch[43] and *N. quadriguttatus* Gerstaecker[44] of the Dimidiatus Group of Handlirsch. Twenty-eight species have been described so far which are referable to it and of these twenty-one are nearctic and seven neotropical. A revision of the species of *Epinysson* will be offered in the near future in another paper of this same general series. The following three new forms are now before me and are described herewith.

Nysson (Epinysson) maiae[45] new species (Pl. VIII, fig. 26.)

The present species is somewhat intermediate between *foxii* Rohwer and *mellipes* Cresson. From both it is separable by the low, opaque, punctate subtuberculate inner margins of the posterior ocelli which in *mellipes* are furnished with distinct, nitidous high tubercles while in *foxii* this area is non-tuberculate. Furthermore in addition, the somatic puncturation and the areolation of the propodeum as set forth in the following description is markedly different.

Type.— ♂ ; three miles north of Perris, Riverside County, California, July 1, 1935, (May K. Gyger; in garden), [Academy of Natural Sciences of Philadelphia, Type no. 4208].

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[40] Sitzber. Akad. Wissen. Wien, xcv, p. 357, (1887).

[41] Sitzber. Akad. Wissen. Wien, xcv, p. 363, (1887).

[42] Sitzber. Akad. Wissen. Wien, xcv, p. 369, (1887).

[43] Sitzber. Akad. Wissen. Wien, xcv, p. 384, (1887).

[44] Sitzber. Akad. Wissen. Wien, xcv, p. 382, (1887).

[45] Dedicated to the collector of the type, my friend Dr. May K. Gyger of Perris, California, as a token of sincere appreciation of her kindness and cordial help.

Male.—8 mm. long. Black; dorsal surface of pronotum and tubercles, transverse crescentic fascia anteriorly on scutellum, hind coxae with a stripe externally, apical fasciae on first three abdominal tergites, that of third narrowly interrupted medially, lateral maculae on fourth and fifth tergites, lemon-yellow. Mandibles except apices which are dark red, scape anteriorly, tegulae and axillary sclerites, mesonotal laminae laterally, femora apically, fore and middle tibiae, russet; hind tibiae and all tarsi dark brown. Wings hyaline, veins dark brown.

Clypeus, front, mesopleura, sterna, postscutellum and lateral areas of the dorsal face of the propodeum with heavy, appressed, short, silvery sericeous pubescence; vertex and temples, pronotum, mesonotum, scutellum, lateral faces of propodeum and abdomen more sparsely clothed with appressed silvery pubescence; apical margins of abdominal tergites and sternites with short fimbriae of fine, close silvery hairs.

Head with a very fine basic acupuncturation upon which is superposed a series of much larger and coarser, well separated pit-like punctures which are closer and somewhat smaller on disc of clypeus; clypeus tumid discally, apical margin evenly arcuate, medio-apically provided with a short, transverse, narrow, nitidous flange laterad of which on each side the apical margin is impressed; postocellar line subequal in length to the ocellocular line; posterior ocelli with low, opaque, punctate subtuberculate prominences at anterior inner corners; antennae extending about to tegulae, scape short, obcuneate, pedicel subglobose to subfusiform, flagellum slightly thickened apically, the first two segments and the pedicel subequal in length, the last article longer than the penult and slightly arcuate beneath, the apex obliquely truncate; temporal carinae absent; no spines or tubercles in gular region.

Thorax with coarse pit-like punctures particularly on mesopleura; pronotum with anterior dorsal margin and lateral angles rounded; scutellum with strong reflexed lateral margins, each anterior lateral corner with a transverse, trigonal, non-pubescent fovea, coarsely punctate anteriorly becoming rugosopunctate caudad; postscutellum rugulose; mesopleura with a weak epicnemium anteriorly and a rather strong one posteriorly for the reception of the middle femora; metapleura and anterior lower half of lateral faces of propodeum nitidous, upper caudal half of latter coarsely punctate. Dorsal face of propodeum with a median trapeziform area which discally has four elongate areolets, the median ones the longest, laterad of the shorter areoles with several irregular subtrigonal areolets; caudad of the four median areoles is a transverse semipanduriform areolet the posterior margin of which is straight, irregularly areolated within; posterior face with a median lyriform areole, laterad of which on each side midway to lateral margin is a somewhat oblique longitudinal carinula, the posterior surface transversely rugulose. Dorsal posterior angles of propodeum strongly and acutely dentate but not distinctly spinose.

Abdomen with tergites coarsely and rather closely punctured, the punctures semiconfluent on penult tergite; sternites more sparsely punctate; first five tergites and second to fifth sternites with apical margins double laterally on each side; last tergite with the pygidial area poorly defined, coarsely and closely punctate throughout, each posterior angle with a long acuminate spine, apical margin between the spines distinctly arcuate caudad.

Female.—Unknown.

This species is known only from the unique male.

Nysson (Epinysson) partamona[46] new species

This species has the superficial habitus of *Nysson* (*Epinysson*) *hoplisivora* Rohwer and *Nysson* (*Epinysson*) *basilaris* Cresson but may be readily distinguished from both by the rounded nondentate pronotum and from the latter species by the presence of the strong, acute tooth projecting from the medio-apical margin of the clypeus.

Type.—♀; Bartica, British Guiana, 1901, (R. J. Crew), [Academy of Natural Sciences of Philadelphia, Type no. 4179].

Female.—8 mm. long. Black; the following fulvous: mandibles except apices which are red, labrum, palpi, scape, pedicel and first three segments of flagellum (the remaining flagellar articles fuscous), legs with the exception of the coxae, tegulae, first abdominal tergite laterally, third and fourth tergites medio-apically. The following lemon-yellow: pronotum with a line dorsally to and including the tubercles, scutellum anteriorly with a transverse arcuate line, first four abdominal tergites with apical fasciae, that of the third broadly interrupted medially, that of the fourth reduced to small, elongate lateral spots. Wings hyaline, somewhat infumated, veins dark brown; pedicel of the petiolate second submarginal cell of the fore wing short, about one-half the length of the free portion of the second transverse cubital vein.

Head clothed with short, somewhat inconspicuous, appressed silvery pubescence which is longer, heavier and more evident on the upper portion of the clypeus; face, vertex and temples semi-opaque, with fine close acupuncturation upon which is superposed a series of sparse, irregularly scattered, coarser punctures; postocellar line about two-thirds the length of the ocellocular line, the posterior ocelli with a low, elongate, shining, highly polished and impunctate tubercle along their inner margins, the tubercles separated from each other by a shallow longitudinal sulcus; temporal carinae absent; no spine or tubercles on lower surface of head

[46] After the Partamona Indians of British Guiana.

in the gular region; antennae with the pedicel subglobose; upper half of clypeus punctured like front, the lower half shining, highly polished, with scattered puncturation, the apical margin gently rounded out and with a strong, projecting, acute tooth medio-apically.

Thorax with thin appressed pubescence, length golden on pronotum, the posterior margin of which has a short, fine pubescent fimbria, pubescence aeneous on mesonotum, and silvery on the pleura and sterna. Pronotum and mesonotum with fine close acupuncturation upon which is superposed a series of heavier, moderately close, rather regularly arranged punctures coarser than those of the front; pronotum rounded anteriorly and laterally, not transversely carinate nor dentate or spinose laterally; mesonotum with a fine impressed, median longitudinal line on the anterior half; scutellum flat, closely, coarsely and rather deeply pitted except anteriorly, laterally with strong reflexed rims, anteriorly with a narrow, deep, transverse, arcuate groove just before the curved yellow macula; postscutellum rugose, raised and projecting slightly forward over the posterior portion of the scutellum; mesopleura anteriorly with a very weak epicnemium, coarsely, irregularly and clathrately pitted, dorsally just below tegulae with a trace of a depressed elongate tubercle; metapleura and lateral faces of the propodeum thinly clothed with short, appressed, light golden pubescence, metapleura and anterior half of the lateral faces of the propodeum smooth and impunctate, the upper posterior half of the latter weakly and irregularly areolated; dorsal face of propodeum with fine, inconspicuous whitish pubescence medially, laterally to the bases of the short, stocky propodeal spines rather heavily clothed with appressed light golden pubescence; median dorsal portion of propodeum with three short longitudinal carinulae, the central one bifurcating posteriorly and thus forming three elongate trigonal areolets which are nitidous within, laterad of these the dorsal area of the propodeum is irregularly areolated; behind the three median dorsal areoles is a large, broad, transverse, somewhat irregular trigonal areolet which is nitidous and glabrous within and divided medially by a low longitudinal carinula, directly below this on the posterior face is a broad median obcuneate areole.

Abdomen clothed with a fine, appressed, silvery pubescence, the tergites and sternites with a short, fine, light golden pubescent fimbria apically and biserially punctate like mesonotum; first four tergites and sternites doubly margined latero-apically; pygidium elongate-trigonal in shape, about twice as long as wide at base, the apex bluntly rounded, the surface with fine, close, basic acupuncturation upon which is superposed a coarser, heavier puncturation making it appear longitudinally striato-punctate.

Legs clothed with very short, fine, appressed silvery pubescence; fore tarsi lacking a tarsal comb; hind femora simple apically; hind tibiae with posterior margins simple, unarmed.

Male.—Unknown.

The species is known only from the unique female.

Nysson (Epinysson) sigua[47] new species (Pl. VIII, fig. 25.)

The present species resembles the Nearctic form *Nysson (Epinysson) tramosericus* Viereck but differs from that species in details of the coloration and in having the anterior dorsal margin of the pronotum rounded and without even the suggestion of a transverse carina there.

Type.—♂; Changuinola District, Bocas de Toro, Panama, May 24, 1924, (J. C. Bradley), [Cornell University].

Male.—6 mm. long. Black; the following fulvous: mandibles except the apices which are red, palpi, antennal scapes, legs distad of coxae, tegulae, and first abdominal tergite laterally. The following lemon-yellow: antennal scapes with an elongate spot anteriorly, pedicel beneath, pronotum with a narrow line dorsally to the tubercles, scutellum anteriorly with a broad, arcuate fascia, and first and second abdominal tergites with broad apical fasciae, that of the second broadly interrupted medially. Wings hyaline with a fuscous tint, veins dark brown; pedicel of the petiolate second submarginal cell of fore wing about one-half the length of the free portion of the first transverse cubital vein.

Head clothed with short, sparse, appressed light golden pubescence which is heaviest and longest on clypeus; front, vertex and temples with a fine, close, basic acupuncturation upon which is superposed a close, almost confluent series of heavier pit-like punctures making the surface appear in places minutely to obscurely rugulose; postocellar line about two-thirds the length of the ocellocular line, the inner margins of the posterior ocelli raised into low, elongate, polished and punctate tubercles separated from each other by a moderately deep, median longitudinal sulcus; clypeus tumid discally, the apical margin evenly arcuate, not dentate medio-apically; antennal pedicel subglobose, the last flagellar article simple, not excavate beneath; temporal carinae absent; gular region edentate.

Thorax with puncturation similar to that of head, and somewhat sparsely clothed with short, appressed pubescence which is light golden on the pronotum, the posterior margin of which is provided with a short golden pubescent fimbria, aeneous on mesonotum, and silvery on the pleura and sterna. Pronotum rounded anteriorly, not transversely carinate there, the lateral angles acutely dentate; scutellum with strong reflexed rims on lateral margins, the anterior third with minute, well separated punctures, the remainder very coarsely, semiconfluently punctured, anteriorly just before the yellow fascia with a deep, narrow, transverse arcuate sulcus broadening out at each anterior lateral corner into a small cuneate fovea; postscutellum strongly rugulose, clothed with decumbent light golden pubescence; mesopleura with a slight epicnemium anteriorly, and with large close shallow pits filled with appressed silvery pubescence, dorsally below the tegulae simple, without a suggestion of a tubercle. Propodeum with the dorsal face clothed with appressed golden pubescence to the bases of the short, stocky propodeal spines, medially with a short, transverse, subtrapezoidal area sharply delimited by carinulae, the posterior margin of which is obtusely angulate cephalad, divided medially by a longitudinal carina laterad of which on each side are several oblique subparallel carinulae, laterad of this median trapezoidal area to bases of the propodeal spines the surface is obscurely and weakly areolate, the areolation obscured by the heavy pubescence; posterior face of propodeum shining, glabrous, impunctate, with an elongate obcuneate areole medially, laterad of which on each side are two narrow, elongate rhomboid areolets, the five areoles irregularly rugulose within; lateral faces of the propodeum and metapleura shining, highly polished and impunctate and irregularly pitted dorsally.

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[47] After the Sigua Indians, a tribe of Nahuatlan stock inhabiting the Bocas de Toro and Chiriqui Lagoon district of Panama.

Abdomen inconspicuously clothed with short, fine, appressed silvery pubescence, fourth to last sternites heavily clothed with semi-erect, silvery pubescence, tergites with an inconspicuous short fimbria of golden hairs along their caudal margins; tergites and sternites with scattered, irregularly arranged, coarse punctures which become closer posteriorly on each segment and closer and coarser on each succeeding tergite; entire apical margin of first tergite, and latero-apical margins of the second to fifth tergites and sternites double; last tergite without a well defined pygidium, latero-apically dentate on each side, the two teeth long, spinoid and projecting considerably beyond the apical margin.

Female.—Unknown.

This interesting Panamanian form is known only from the unique male described above.

NIPPONONYSSON Yasumatsu & Maidl

Nippononysson Yasumatsu & Maidl, Festschr. z. 60 Geburst. E. Strand, I, p. 501, pl. xiii, (1936).

GENOTYPE: *Nippononysson rufopictus* Yasumatsu & Maidl. (By original designation.)

This interesting and peculiar Japanese genus exhibits a number of features that are atypical of the tribe, chief among which are the nondentate posterior angles of the propodeum and the large stigma. I have seen no material of this monotypic group and so am unable to allocate *Nippononysson* with any certitude to its proper phylogenetic position, particularly inasmuch as Yasumatsu and Maidl neglect to state the character of the hind femora and tibiae and the front. However, from their figures and their failure to note any distinguishing features of these members, I judge that the hind tibiae and femora are simple and unarmed and that the front lacks a keel. If this be so, then *Nippononysson* belongs in the general neighborhood of the *Hyponysson-Epinysson* complex, indeed was derived in all probability from the same ancestral stock from which these groups originated. The chief differential characters of *Nippononysson* are given in the foregoing key to genera on a preceding page.

FOXIA Ashmead

Foxia Ashmead, Ent. News, IX, p. 187, (1898).—Ashmead, Canad. Entom., XXXI, p. 326, (1899).—Patton, Ohio Naturalist, IX, p. 443, (1909).—Pate, Mem. Amer. Ent. Soc., no. 9, p. 28, (1937).

Nysson (*Foxia*) Rohwer, Proc. U. S. Nat. Mus., LIX, p. 404, (1921).

GENOTYPE: *Foxia pacifica* Ashmead, 1898. (Original designation and monobasic.)

The characteristic venation of the fore wing immediately separates *Foxia* from all the other genera of this tribe. In addition, it is unique in the Nyssonini in having the antennae arise from simple, round sockets not overhung by frontal lobes, and in possessing a scapal area on the front that is concave rather than tumid or convex as in the other Nyssonid genera. Likewise quite characteristic of the genus are the dentate abdominal sternites and the more or less clavate antennae which in the males on superficial examination appear only twelve-segmented. The actual terminal joint has become very much reduced in size so that it remains as only a small papilliform process, separated, however, from the penult article by a more or less distinct suture. The shape and position of this thirteenth segment is quite characteristic for the species in the specimens I have examined and as such may prove to be of importance as a diagnostic character.

The genus represents a peculiar and interesting lateral development from an ancestral stock such as *Epinysson*. In common with *Brachystegus* and *Metanysson*, the males of *Foxia* have the medio-apical margins of the abdominal sternites provided with heavy fringes of long white hairs but unlike the members of those genera, the species of the present genus lack the serrate or dentate hind tibiae and toothed hind femora. The structure of the legs and thorax of *Foxia* is reminiscent of *Cresson* but the well developed frontal crista that is so characteristic of the latter is wanting in this genus. The key to genera on a preceding page will serve to differentiate *Foxia* from the other genera of Nyssonini.

Generic Characters.—Head subcircular, vertex arched, more or less convex; antennal insertions not overhung medially above by frontal lobes, the sockets with simple reflexed rims; front strongly concave at and above the antennal insertions, never tumid or convex although occasionally provided with a small cristate tubercle or a short longitudinal keel medially above the antennal insertions; antennae clavate apically, apparently twelve-segmented in both sexes, the actual thirteenth joint in the males very small, papilliform and apparently only a tubercle of the twelfth article.

Thorax with the scutellum without strongly reflexed lateral margins, weakly margined at most, anteriorly without trigonal pits or a transverse furrow; postscutellum simple; mesopleura without or with only a weak epicnemium anteriorly, and dorsally just below the tegulae generally simple, without spines, tubercles or an auriculate carina.

Legs with the hind femora simple apically, without a truncate reniform tooth beneath at apex; hind tibiae with the posterior margins simple, smooth, or at most weakly spined, never dentate, serrate or serrulate; fore tarsi of females without a tarsal comb.

Wings with three submarginal cells in the fore wing, the second petiolate and receiving only the first recurrent vein, the second recurrent vein received by the third submarginal cell; hind wings with the cubitus arising far beyond the transverse median vein.

Abdomen with little or no constriction between the first and second segments; second sternite over one-half the length of abdomen; apical margins of both tergites and sternites obscurely doubly margined, at least laterally, and finely, silvery fimbriate apically; second to penult sternites strongly dentate latero-apically on each side; males with the second to penult sternites usually provided with a long fringe of white hairs medio-apically; females with the last tergite not meeting on the mid-ventral line and thus enclosing the corresponding sternite; both sexes with a distinct pygidium which is often tridentate apically, that of the male quadrate or transversely rectangular, that of the female trigonal.

Distribution.—This genus is restricted entirely to the new world so far as known at present. Although as yet only three species of *Foxia* are known from South and Central America, the biocentre of the genus is probably in one of those regions and consequently the group may be considered to be primarily a Neogaeic one. It is apparently an ectogenic element of the Nearctic fauna, for like *Metanysson, Foxia* appears to have invaded the Nearctic region only in the lower sonoran zone of the southwestern United States.

Species of the Genus. — The species known to me that are referable to this genus are *Foxia pacifica* Ashmead, *F. secunda* Rohwer and *F. navajo* and *cuna* described on the following pages. In addition, two Brazilian forms — *divergens* and *mutilloides* — originally described and placed by Ducke in *Nysson,* probably belong to this genus. Although I have seen no material of either of them, nevertheless their descriptions indicate practically without shadow of doubt that they should be assigned to *Foxia.*

Key to Species of Foxia

1. Males 2
   Females 6
2. Front tuberculate discally; pygidium tridentate apically; (California). *pacifica* Ashmead
   Front simple, not tuberculate discally 3
3. Pygidium transversely rectangular and bidentate apically, the apical margin squarely truncate between the lateral teeth; (California and Arizona) .... *secunda* Rohwer
   Pygidium distinctly tridentate apically, or the apical margin angulate caudad between the lateral teeth 4
4. Abdomen entirely black; pygidium subquadrate, each posterior angle with a long spinoid tooth, the apical margin angulate caudad; (South and Central American forms) 5
   Abdomen red in large part; pygidium transversely rectangular and strongly tridentate apically; clypeus tridentate medio-apically; (California to Texas and Oklahoma) .... *navajo* new species
5. First five abdominal tergites with yellow maculae laterally; (Brazil). *divergens* (Ducke)
   First two abdominal tergites only with yellow maculae laterally; clypeus bidentate medio-apically; (Panama) .... *cuna* new species
6. Front tuberculate discally 7
   Front simple, not tuberculate discally 8

7. Mesopleura with a small tubercle dorsally just below the tegulae; pygidium compressed, declivous, triangular with the apex acute; clypeus not tridentate medio-apically; (Brazil) ..*mutilloides* (Ducke)
   Mesopleura simple, without a tubercle dorsally below the tegulae; pygidium not compressed or declivous, the lateral margins subserrulate, the apex bidentate; clypeus tridentate medio-apically; (California) ....*pacifica* Ashmead
8. Abdomen black; pygidium not tridentate apically; (Brazil). *divergens* (Ducke)
   Abdomen red in large part; pygidium tridentate apically; (California to Texas and Oklahoma) ....*navajo* new species

Foxia secunda Rohwer (Pl. VIII, fig. 15.)

Nysson (*Foxia*) *secunda* Rohwer, Proc. U. S. Nat. Mus., LIX, p. 407, (1921). [♂.]

Type.— ♂; Claremont, California, (C. F. Baker), [United States National Museum, Cat. no. 23456].

This species bears a superficial resemblance to the other known North American forms, agreeing with them in having the clypeus tridentate medio-apically. However, *secunda* is readily separable from both *pacifica* and *navajo* by the transversely rectangular bidentate pygidium, the apical margin of which is squarely truncate between the teeth; in *pacifica* and *navajo* the pygidium is strongly tridentate apically. Only the male sex of *secunda* is as yet known.

Distribution.—On the basis of the data now at hand, *secunda* is apparently confined to the xeric areas of southern California and the extreme western portion of Arizona.

Specimens examined: 6 males.

CALIFORNIA: 3♂, Whittier, Los Angeles County, August 11, 1920, (P. H. Timberlake; in river bottom[48] at glands of *Helianthus*), [Timberlake]. 1♂, Claremont, Los Angeles County, (C. F. Baker), [*type,* U.S.N.M.]. 1♂, Alpine, San Diego County, June 20, 1920, [Cornell].

ARIZONA: 1♂, Yuma, Yuma County, May 4, 1918, (J. C. Bradley), [Cornell].

Foxia navajo[49] new species (Pl. VII, figs. 1, 6; Pl. VIII, figs. 16, 21.)

The major differential characters of this distinctive species are given in the key to species on a preceding page. The present form has the superficial habitus of the genotype, *pacifica*, its closest relative in all probability, but is separable from that species by the absence of the frontal tubercle. The last flagellar article of the males of *navajo* is much smaller and more excentric than in *pacifica* while the female pygidium of the present species is tridentate with the lateral margins simple whereas in *pacifica* the pygidium is bidentate with the lateral margins weakly serrulate.

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[48] Possibly the San Gabriel River.

[49] After the Navajo Indians of the southwestern United States.

Type.—♂; El Paso, El Paso County, Texas, altitude 3,650 to 4,000 feet, July 11, 1907, (Rehn & Hebard). [Academy of Natural Sciences of Philadelphia, Type no. 4180].

Male.—4 mm. long. Black; mandibles fulvous, apices red; legs fulvoferruginous except the fore and middle femora which are fuscous, hind tibiae with a fuscous stripe posteriorly; calcaria of middle and hind tibiae black; abdomen with first four segments ferruginous, last two segments dark brown, first tergite with a narrow yellow fascia apically, narrowly interrupted medially. Wings clear hyaline, veins dark brown.

Head, thorax, lateral areas of dorsal face of propodeum, anterior half of first abdominal tergite and second sternite wholly, with moderately heavy appressed silvery pubescence; apical margins of abdominal tergites and sternites with short fimbriae of fine silvery hairs.

Head with strong, semiconfluent, deep and rather coarse punctures; eyes converging strongly below, the lower half of their inner orbits somewhat raised; clypeus tumid discally, the apical margin evenly arcuate and minutely tridentate medio-apically, the median tooth the largest; antennal scapes short and obovate, the pedicel subglobose and subequal in length to the first flagellar article, flagellum subclavate apically, the last segment small, papilliform, excentric, and separated from the penult article by a fairly definite suture; front with a glabrous, concave, nitidous scapal basin, simple and unarmed above; ocelli large, arranged in a very low triangle, the ocellocular line longer than the postocellar line; ocellar area not tuberculate; gular region without spines or tubercles.

Thorax with strong, rather coarse semiconfluent pit-like punctures; pronotum narrow, transverse, with the anterior dorsal margin rounded except medially where it is briefly and transversely carinate, the upper lateral angles inconspicuously dentate, lower angles with a strong, prominent spine projecting sideward laterally on each side, no keel or carina descending from the upper lateral tooth to the lower spine; scutellum weakly margined laterally; postscutellum simple, unarmed; mesopleura with a weak epicnemium anteriorly; metapleura and lateral faces of the propodeum glabrous, shining, coarsely and longitudinally striate; dorsal face of propodeum medially immediately following postscutellum with a series of longitudinal, somewhat radiating carinulae which form a transverse series of elongate areolets; posterior face finely rugulose throughout and medially with a narrow cuneate areole which immediately follows the transverse series of elongate areolets on the dorsal face; propodeal spines short, acuminate.

Abdomen rather closely and coarsely punctate, the punctures almost confluent on last two tergites; second to fifth sternites strongly dentate latero-apically on each side and medio-apically with a long fringe of white hairs; pygidium transversely rectangular and trispinose apically.

Allotype.—♀; Las Cruces, Dona Ana County, New Mexico, (T. D. A. Cockerell), [Academy of Natural Sciences of Philadelphia].

Female.—4.5 mm. long. Similar to the male except that the last flagellar article is not small and excentric, the sternites are devoid of fringes of white hair; the pygidium is subtrigonal with the lateral margins simple, not serrulate, and the apex strongly tridentate.

Paratypes.—5 males, 5 females, as follows:

OKLAHOMA: 1 ♀, Optima, Beaver County, July 19, 1933, (Reynold Dahms).

TEXAS: 1 ♀, Sierra Blanca,[50] Hudspeth County, elevation 4,509 feet, July 8, 1917,[51] (Joseph Bequaert), [Museum of Comparative Zoology].

ARIZONA: 2 ♂, Tempe, Maricopa County, July 31, 1917, (Joseph Bequaert), [M.C.Z.]. 1 ♀, Rio Arivaipa, 2,500 feet elevation, [U.S.N.M.].

CALIFORNIA: 1 ♀, near Poway, San Diego County, July 31, 1925, (P. H. Timberlake; on *Eriogonum gracile*), [Timberlake]. 1 ♀, near Palm Springs, Riverside County, June 8, 1930, (P. H. Timberlake; on *Eriogonum trichopes*), [Timberlake]. 1 ♂, Colorado Desert, 5 miles north of Palm Springs, Riverside County, June 8, 1930, (P. H. Timberlake; in shade of leafy plants), [Timberlake]. 1 ♂, Riverside, Riverside County, July 3, 1933, (P. H. Timberlake; on *Eriogonum gracile*), [Timberlake]. 1 ♀, 1 ♂, Brawley, Imperial County, August 19, 1914, (J. C. Bradley), [Cornell].

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[50] The pin label on the specimen reads "Sierra Blanca, El Paso County, Texas." Since this material was taken, the old county of El Paso has been divided into the present El Paso and Hudspeth Counties.

[51] *Cf.* Bradley [1919, Scientific Monthly, VIII, p. 413] for an account of this region.

Variation.—The material from California and Arizona exhibits marked erythric tendencies, the abdomen save for the yellow fascia on the first tergite being entirely bright ferruginous as are also the legs; even the propodeum is partially red in some of the specimens. In addition, the head, thorax and abdomen of the specimens from these areas are clothed with a much heavier appressed silvery sericeous pile than those from New Mexico, Texas and Oklahoma. Otherwise, however, the western material from California and Arizona agrees in all essential respects with the type.

Distribution.—This species is widely distributed throughout the lower Sonoran zone of the southwestern United States, ranging from southwest and south-central California (San Diego, Riverside and Imperial Counties) eastward across southern Arizona (Maricopa County) and New Mexico (Dona Ana County) to western Texas (El Paso and Hudspeth Counties) and reaching as far as the panhandle area of Oklahoma (Beaver County).

Foxia pacifica Ashmead (Pl. VII, figs. 7; Pl. VIII, figs. 13, 14.)

Foxia pacifica Ashmead, Ent. News, IX, p. 187, (1898), [♂, ♀].—Ashmead, Canad. Entom., XXXI, p. 329, (1899), [♀, ♂].—Patton, Ohio Nat., IX, p. 443, (1909), [♀].—Pate, Mem. Amer. Ent. Soc., no. 9, p. 28, (1937).

Lectotype.—♂; Los Angeles, California, (D. W. Coquillett), [United States National Museum, Type no. 5017].

Ashmead originally described this species from three specimens, two males and one female, all bearing the same data. From these a male is chosen here as the lectotype since this sex exhibits the most distinctive specific features in *Foxia.* The female specimen may be regarded as the allotype.

As in the two other known North American forms, *pacifica* has the clypeus minutely tridentate medio-apically in both sexes. The males of *pacifica* agree with those of *navajo* in having the pygidium transversely rectangular and strongly tridentate apically, but the last flagellar article of the present species while somewhat excentric is much larger and more distinct than the papilliform one of the males of *secunda, navajo,* or *cuna.* The females of *pacifica* have the pygidium bidentate apically with the lateral margins subserrulate and the disc shallowly concave just before the apical margin, whereas in *navajo,* the only other North American form in which the female sex is known, the pygidium is distinctly tridentate apically and the lateral margins show no signs of serrulation while the disc is flat or convex throughout. Both sexes of *pacifica* may be immediately differentiated from the other known North American forms by the small discal tubercle on the front, agreeing in this respect with the Brazilian *mutilloides* from which it may be distinguished by the characters set forth in the foregoing key to species of this genus.

Distribution.—Like *secunda,* the present species is apparently confined to the xeric regions of southern California. Further collecting will probably reveal its presence in Baja California, northern Sonora, and western Arizona.

Specimens examined: 7; 4 males, 3 females.

CALIFORNIA: 2♂, 1♀, Los Angeles, Los Angeles County, (D. W. Coquillett), [*types,* U.S.N.M.]. 2♀, 1♂, Mohave River at Deep Creek, San Bernardino County, August 14, 1936, (P. H. Timberlake; on *Eriogonum gracile*), [Timberlake]. 1♂, Gavilan,[52] Riverside County, May 31, 1937,

Foxia mutilloides (Ducke)

Nysson mutilloides Ducke, Verh. Zool.-Bot. Ges. Wien, LIII, p. 266, (1903). [♀.]

This species is known to me only from Ducke's original description which constitutes the sole authoritative data we have on this species. Although originally recorded as a *Nysson,* it indubitably does not belong to that genus as here understood and I refer it somewhat doubtfully to *Foxia* principally upon the character of the venation and the simple, unarmed hind tibiae. Ducke makes no mention of any latero-apical spines on the abdominal sternites and his description of the last abdominal segment is quite anomalous for a member of this genus. Until material is forthcoming to settle the exact generic position of *mutilloides* I shall regard it provisionally as a species of *Foxia.*

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[52] This is a plateau region between Gavilan Peak and the Cajalco Reservoir to the north of it known locally as "The Gavilan".

(P. H. Timberlake), [Timberlake].

The front of the present species is armed with a small tubercle as in *pacifica* from which it may be distinguished, as well as from all other members of the genus, by the features given in the foregoing key to species.

Apparently *mutilloides* was described from a series of females taken at various places and the exact locality in Brazil from which the type came or the collection wherein it now rests is not at present known.

Distribution.—Ducke states he has taken *mutilloides* flying about among the foliage of the damp forest and has recorded it from the following localities in the state of Grão Pará.

Brazil: Pará, February 6; Itaituba (on the Rio Tapajos), September 4, 1902.

Foxia divergens (Ducke)

Nysson divergens Ducke, Verh. Zool.-Bot. Ges. Wien, LIII, p. 268, (1903). [♀, ♂.]

As in the case of *mutilloides,* I know the present species only from Ducke's original description. Although recorded as a *Nysson, divergens* is clearly a member of the genus *Foxia* and is apparently most closely related to the Panamanian *cuna.* The differential characters separating *divergens* from that species as well as from all other forms of the genus have been given in the key to species on a preceding page.

The species was originally described from a series of males and females taken at various places and the exact locality in Brazil from which the type came or the collection wherein it and the rest of the type series now rests is not at present known.

Distribution.—Ducke states he has taken *divergens* flying from July to October just above the ground in the shadowy forest trails of the state of Grão Pará in Brazil and records it from the following localities.

Brazil: Jambú-assú (113 km. east of Pará); Mazagão (north of the mouth of the Amazon); Itaituba (on the Rio Tapajos); Obidos.

Foxia cuna [53] new species (Pl. VIII, fig. 22.)

The closest relative of the present species is apparently *divergens,* from which it differs in details of colouration, puncturation, and in having the clypeus provided with two short thorn-like teeth medio-apically.

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[53] After the Cuna Indians of the Isthmus of Darien, Panama.

Type.— ♂; Alhajuelo, Panama, March 4, 1912, (August Busck), [United States National Museum].

Male.—5 mm. long. Black; mandibles light brown, apices red; scape, tibiae, and tarsi, fuscous; middle and hind femora apically above with a yellowish-brown spot; first and second abdominal tergites apically with a narrow light yellow stripe which is broadly interrupted medially. Wings hyaline, infumated throughout, veins dark brown.

Clypeus, sides of face, temples and propodeum laterally above, with whitish sericeous pubescence; front, vertex, pronotum, mesopleura and legs with fine, appressed, whitish pubescence; mesonotum, scutellum and abdomen finely puberulent; metapleura and lateral faces of propodeum glabrous, shining; abdominal sternites with short silvery fimbriae along apical margins.

Head strongly pitted, the punctures close and semiconfluent on the front, well separated on vertex; eyes converging strongly below; clypeus with two small thorn-like teeth medio-apically; scapes subglobose, flagellum clavate, the pedicel and first three segments of the flagellum subequal, the first flagellar article the longest; ocelli large, arranged in a low subequilateral triangle, the ocellar area not tuberculate, the ocellocular line slightly longer than the postocellar line; gular region without spines or tubercles.

Thorax with the pronotum punctured similar to the front and narrow, transverse, sharply and vertically declivous anteriorly to neck, the anterior dorsal margin not transversely carinate, lateral angles sharp and subdentate, a keel or carina descending vertically from each anterior lateral angle. Mesonotum coarsely, irregularly pitted, with a median longitudinal line anteriorly for one-half its length; scutellum margined laterally and punctured like mesonotum; postscutellum simple, unarmed, and irregularly rugulose. Mesopleura and sternum strongly and closely pitted; mesosternum strongly, transversely margined anteriorly; mesopleura rounded anteriorly, without an epicnemium. Metapleura and lateral faces of the propodeum shining, highly polished and impunctate. Propodeum nitidous dorsally, immediately behind the postscutellum with a number of parallel longitudinal carinulae enclosing a transverse series of elongate rectangular areolets, following which on the posterior face is a broad, transverse, irregular hexagonal enclosure, ventrad of which is a narrow, longitudinal rectangular areolet to the base of the propodeum, the posterior face of which is nitidous.

Abdomen with fine, semiconfluent acupuncturation upon which is superposed a series of moderately close, irregularly arranged pits comparable to those of vertex, and which while well separated on first two tergites become progressively closer on each successive tergite until they are almost confluent on the penult and confluent on the last making the surface there appear finely rugose; second to fifth sternites inclusive dentate latero-apically on each side and with a long fringe of white hairs medio-apically; pygidium latero-apically on each side with a spinoid tooth, between which the apical margin is obtusely angulate caudad.

Female.—Unknown.

The species is known only from the unique male.

CRESSON [54] new genus

Nysson [in part] Reed, An. Univ. Chile, LXXXV, p. 641, (1894).—Brèthes, An. Mus. Nac. Hist. Nat. Buenos Aires, XXIV, p. 135, (1913).—Jaffuel & Pirión, Rev. Chileña Hist. Nat., XXX, p. 378, (1926).

GENOTYPE: *Nysson parvispinosus* Reed, 1894 [=*Cresson* (*Cresson*) *parvispinosus* (Reed)].

This peculiar and interesting genus possesses features which are curious and somewhat anomalous. In the other genera of the Nyssonines known to me, the hind femora have a truncate subreniform tooth apically beneath and the hind tibiae are dentate, serrate or serrulate when the front is cristate or keeled. In *Cresson,* however, although the front is provided with one of the most strongly developed cristate keels of the tribe, the hind femora are simple apically and the hind tibiae are unarmed. Both sexes, moreover, lack a pygidial area, and the females furthermore have a well developed and apparently functional tarsal comb on the fore tarsi. In all the other Nyssonini, this latter, when present, is vestigial or aborted. All these characters taken in conjunction with one another immediately stamp *Cresson* as a distinct group discrete from the other genera of the Nyssonid complex.

Generic Characters.—Head subtrigonal, truncate below and also above at the dorsal margins of the compound eyes; vertex flat, not arched; antennae filiform, distinctly 13-segmented in the males and 12-segmented in the females; antennal insertions overhung medially above by small frontal lobes; front medially just above antennal insertions with a sharp cristate keel forking dorsally and resembling a capital ypsilon in shape.

Thorax with the scutellum not margined laterally, anteriorly without a transverse trough or furrow separating it from the mesonotum, the anterior lateral corners without trigonal pits or depressions; postscutellum simple; mesopleura anteriorly without an epicnemium, omaulus obsolete, and dorsally just below the tegulae simple, without crests, tubercles, or an auriculate carina; metapleura and lateral faces of propodeum ankylosed.

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[54] I take great pleasure in dedicating this peculiar and interesting group to the late Ezra Townsend Cresson, Sr., in recognition of his excellent work upon the Aculeate Hymenoptera, and the Nyssonids in particular.

Legs with hind femora simple apically, without a truncate subreniform dentoid process beneath; hind tibiae with posterior margins unarmed, never dentate, serrate or serrulate but weakly spined at most; fore tarsi of females with a well developed tarsal comb.

Wings as in *Zanysson;* fore wings with three submarginal cells, the second petiolate and receiving both recurrent veins; hind wings with the cubitus arising well beyond the transverse median vein.

Abdomen with little or no constriction between the first and second segments; tergites and sternites obscurely doubly margined apically and extremely finely silvery fimbriate along their caudal margins; last tergite without a pygidial area in either sex, transversely subsemicircular in shape and usually multidentate apically.

Relationships.—The precise affinities of Cresson are rather doubtful. It is obviously a rather ancient isolated type somewhat intermediate between *Nysson* and the *Brachystegus-Zanysson-Metanysson* complex, and may possibly be most closely related to some of the Australian forms of which I have unfortunately as yet seen practically no material.

Distribution.—The genus is wholly Neotropical so far as is known at present. Upon the basis of the available data, *Cresson* is apparently confined entirely to the Chilean and adjacent Patagonian regions.

Subgenera.—Within the genus there are two well marked groups which I believe are worthy of being accorded subgeneric rank and which may be recognized by means of the following table.

Key to the Subgenera of Cresson

Last tarsal segment with a small but evident pulvillus between the tarsal claws; abdominal tergites and sternites simple, not dentate or spinose latero-apically; males with but one apical spur on middle tibiae and with the second to fifth abdominal sternites with long fringes of white hair medio-apically; (Chilean forms) ....*Cresson* new subgenus

Last tarsal segment without a pulvillus between the claws; abdominal tergites and sternites dentate or spinose latero-apically; second to fifth abdominal sternites of males without fringes of hair medio-apically; (Patagonian forms) ....*Perisson* new subgenus

CRESSON new subgenus

Nysson [in part] Reed, An. Univ. Chile, LXXXV, p. 641, (1894).—Jaffuel & Pirión, Rev. Chil. Hist. Nat., XXX, p. 378, (1926).

GENOTYPE: *Nysson parvispinosus* Reed, 1894 [= *Cresson (Cresson) parvispinosus* (Reed)].

This group, based upon the Chilean species *Nysson parvispinosus* Reed, and apparently confined to that region, is a rather anomalous one in certain respects. Whereas all the other genera of the Nyssonini have two calcaria on the middle tibiae in both sexes, the males of this typical subgenus of *Cresson* possess but one. Ordinarily in the Sphecoids both sexes have the same number of apical spurs on the middle tibiae, although *Dinetus* and *Didineis* are well know exceptions. This interesting peculiarity likewise occurs in certain species of *Heliocausus*.

Subgeneric Characters.—In addition to the features given under the generic characterization, the tarsi have small but evident pulvilli between the tarsal claws; middle tibiae of females with two calcaria apically, males with but one apical calcar; latero-caudal angles of abdominal tergites and sternites simple, not spinose or dentate; males with the second to fifth abdominal sternites provided with long fringes of white hair medio-apically.

There is but one species which at present may be assigned to the typical subgenus of *Cresson*.

Cresson (Cresson) parvispinosus (Reed)
(Pl. VII, figs. 4, 8; Pl. VIII, figs. 27, 28.)

Nysson parvispinosus Reed, An Univ. Chile, LXXXV, p. 641, (1894); [♀, ♂; Colchagua Province, Chile.]—Dalle Torre, Catal. Hymen., VIII, p. 573, (1897).—Jaffuel & Pirión, Rev. Chileña Hist. Nat., XXX, p. 378, (1926); [♂, ♀; Valle de Marga-Marga, Chile; January, on *Ammi Visnaga*.].

Type.—♀; Colchagua Province, Chile, 1890, (E. C. Reed), [Herbst Collection, Museum of Comparative Zoology, Type no. 17200].

I have examined the type of this species in the Museum of Comparative Zoology at Cambridge and find that in addition to the characters given in the above generic and subgeneric diagnoses, and those enumerated by Reed in his original description of the species that in the female the last abdominal tergite is subsemicircular to subtrigonal in shape with the apex bidentate and the lateral margins are minutely serrulate. In the males the last flagellar article is narrow and falcate while the last abdominal tergite is subsemicircular to transversely subquadrate with the margin septemdentate.

Distribution.—Upon the basis of the present data, *Cresson (Cresson) parvispinosus* is apparently confined to the region of west central Chile.

Specimens examined: 16; 8 males, 8 females.

COLCHAGUA PROVINCE: 1♀; 1890, (E. C. Reed), [*type*, M.C.Z.].

VALPARAISO PROVINCE: Valparaiso: 1♀, November 26, 1919; 1♂, December 25, 1920; 1♀, January 12, 1921; 1♂, January 19, 1921, [all M.C.Z.]. 1♂, 1♀; Limache, January 31, (A. Faz), [American Museum of Natural History]. 1♀, Concepcion, December 4, 1910, [M.C.Z.]. 1♀, Olmué, February 4, 1920, [M.C.Z.]. 1♀, Altos de Lliu-Lliu, January 20, 1919, [M.C.Z.]. 1♀, Marga-Marga, January 9, 1919, [M.C.Z.]. 2♂, (A. Faz), (no other data), [Cornell].

SANTIAGO PROVINCE: Cerros de Tiltil: 1♀, January 18, 1919; 1♂, January 16, 1919; 1♂, January 1920; [all M.C.Z.].

PERISSON[55] new subgenus

Nysson Brèthes [in part], An. Mus. Nac. Hist. Nat. Buenos Aires, XXIV, p. 135, (1913).

GENOTYPE: *Nysson basirufum* Brèthes, 1913 [= *Cresson (Perisson) basirufus* (Brèthes)].

Although the present group has the general superficial habitus of *Cresson* in the restricted sense, nevertheless there are a number of basic morphological features as set forth in the key to subgenera on a preceding page wherein *Perisson* differs from the typical members of *Cresson*. I have seen material of only the females of *Nysson basirufum* Brèthes but in his original description the author makes no mention of medio-apical fringes of hair on the abdominal sternites of the males, structures which are such a distinctive feature of this sex in the typical subgenus of *Cresson*. Brèthes furthermore indicates that the abdominal sternites and tergites of both sexes are spinose latero-apically. Whereas *Cresson* possesses small but evident pulvilli on the tarsi, *Perisson* is unique in the Nyssonini in lacking these structures between the tarsal claws. In all the other members of this tribe known to me, both sexes possess pulvilli, while in *Foxia*, the only other group of this complex I am acquainted with that has either the abdominal tergites or sternites dentate,[56] both sexes have this feature in common. Consequently at the present state of our knowledge, I believe it well to regard *Perisson* and *Cresson* as at least subgenerically distinct.

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[55] From περισσόν, strange, remarkable form, in allusion to its unusual habitus.

Subgeneric Characters.—In addition to the features given under the generic characterization, the tarsi lack pulvilli between the tarsal claws; middle tibiae of both sexes with two calcaria apically; latero-caudal angles of the abdominal tergites and sternites dentate or spinose; males with the second to fifth abdominal sternites devoid of long fringes of hair medio-apically.

There is but one species, the type, which at present may be assigned to *Perisson*.

Cresson (Perisson) basirufus (Brèthes) (Pl. VIII, fig. 17.)

Nysson basirufum Brèthes, An. Mus. Nac. Hist. Nat. Buenos Aires, xxiv, p. 135, (1913). [♀, ♂.]

Original Material.—Brèthes described this species from the Argentine, basing it upon a female and a male and stating that one specimen was taken at Coria in the province of Mendoza on December 6, 1908 while the other was collected by P. Jörgensen at Alto Pencoso in the province of San Luis on February 1, 1908. Both specimens are in the collection of the National Museum of Natural History at Buenos Aires. I have not seen the types of this species and Brèthes gives no indication in his description or notes what locality data is applicable to the female and what to the male. I believe it would be well to regard the female upon which Brèthes based his description as the holotype of this species.

Despite the fact that I have not seen the types, Brèthes' description is sufficiently full and clear as to leave no doubt in my mind that the following material which I have identified as *Nysson basirufum* Brèthes is that species.

Distribution.—The present form is apparently confined to the Cisandean piedmont of the Argentine.

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[56] Turner has described several Australian species of *Acanthostethus* that have the abdominal sternites spinose latero-apically.

Specimens examined: 2 females.

ARGENTINA: 1♀, Potrerillos, Mendoza Province, 4000 ft. altitude, March 16-20, 1920. 1♀, Pie de Palo, San Juan Province, March 11, 1920, (J. C. Bradley), [Cornell].

BRACHYSTEGUS A. Costa[57]

Brachystegus A. Costa, Faun. Regn. Napoli, Imen, Acul., Nissonid., p. 24, (1859).—Pate, Ent. News, XLVI, p. 250, (1935).—Pate, Mem. Amer. Ent. Soc., no. 9, p. 14, (1937).

Nysson [in part] Handlirsch, Sitzber. Akad. Wissen. Wien, XCV, p. 319, (1887).—Berland, Faune de France, X, p. 99, (1925).—Arnold, Ann. Transvaal Mus., XIII, p. 218, (1929).—Schmiedeknecht, Hymen. N. u. M.-Europas, Zw. Aufl., p. 688, (1930).

GENOTYPE: *Nysson Dufouri* Dahlbom, 1845 [=*Brachystegus Dufouri* (Dahlbom) =*Nysson scalaris* Illiger, 1807=*Brachystegus scalaris* (Illiger)]. (Monobasic.)

The genus *Brachystegus* is either ancestral to, or a representative of, a stock from which *Zanysson* and *Metanysson* have arisen. The congeries of characters—the serrulate to dentate hind tibiae, the apically toothed hind femora, the keeled front, and the medio-apical fringes of hair on the abdominal sternites of the males—these three genera possess in common to a greater or lesser degree stamp them as a discrete group from *Nysson, Foxia* and *Cresson.* The chief differential features of *Brachystegus* have already been given in the key to genera on a preceding page.

Inasmuch as this genus has been so uniformly misunderstood in the past, a definition of the group based upon a study of European and African material is given here.

Generic Characters.—Head subcircular in anterior aspect, vertex arched, convex; antennae filiform, distinctly 13-segmented in the males and 12-segmented in the females; antennal insertions overhung medially above by small frontal lobes; front with a short median longitudinal cristate keel or carina just above the antennal insertions; anterior margin of the gula more or less produced.

Thorax with the scutellum with or without the lateral edges margined, each anterior lateral corner provided with a trigonal pit which is usually connected with the other by a narrow, non-pubescent, transverse furrow; mesopleura with an epicnemium anteriorly, and either simple, tuberculate, or with an auriculate carina dorsally just below the tegulae.

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[57] The nomenclatorial history presented here is only partial.

Legs with the hind femora armed apically beneath with a very small truncate subreniform tooth; hind tibiae with the posterior margins irregularly and finely serrulate, the teeth not regularly arranged in one definite row; last tarsal segment somewhat inflated, the pulvilli rather large; fore tarsi of females without a tarsal comb; hind coxae internally with a sharp carina lengthwise on opposing surfaces.

Wings with three submarginal cells in the fore wing, the second petiolate and receiving both recurrent veins, the third and combined first and second transverse cubital veins often almost contiguous anteriorly on the radius; hind wings with the cubitus arising far beyond the transverse median vein.

Abdomen with the second to fifth tergites and sternites doubly margined and very finely fimbriate apically, the sternites not dentate latero-apically; a distinct pygidial area usually present in both sexes, that of male tridentate or multidentate, that of female simple, the lateral margins not serrate or serrulate; last tergite of female not meeting on the mid-ventral line and thus enclosing the corresponding sternite; males generally with the second to fifth abdominal sternites furnished with a fringe of long white hairs medio-apically.

Nomenclatorial History.—Handlirsch when he published his monograph of the genus *Nysson* in 1887 placed *Brachystegus* Costa in the synonymy of the large, cumbersome, portmanteau group he termed *Nysson.*[59] This, however, he divided into a number of distinct species groups, many of which are now regarded as discrete genera, and one of which represented Costa's genus *Brachystegus.* Nevertheless subsequent authors have misinterpreted Handlirsch's action. When they have employed *Brachystegus,* they have applied the name to that subgenus of *Nysson* in which the cubitus of the hind wing arises beyond the transverse median vein. However, as I have indicated elsewhere,[58] this has been a misapplication of the name; *Brachystegus* Costa is quite distinct from *Nysson.* The species which have hitherto been assigned to *Brachystegus* Auctt., *nec* Costa are now referable to *Epinysson.*

Species of Genus.—As understood here, *Brachystegus* comprises the Scalaris[60] Group, and likewise in all probability also the

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[58] Ent. News, XLVI, p. 250, (1937); *v. et.* Mem Amer. Ent. Soc., no. 9, p. 12, footnote 25, (1937).

[59] Sitzber. Akad. Wissen. Wien., xcv, p. 281, (1887).

[60] Sitzber. Akad. Wissen. Wien, xcv, p. 319, (1887).

Fulvipes Group [61] of Handlirsch. In addition, there are a number of species described from the Orient and South Africa which I believe should be assigned to this genus,[62] but I know these forms in the main merely from the literature and only venture to place them tentatively in this genus at the present juncture.

Distribution.—On the basis of the data now available, *Brachystegus* is entirely old world in distribution, inhabiting the Palaearctic, Aethiopian and Oriental regions. Many authors have erroneously assigned various new world species to this group but all such species belong to *Epinysson* as I have pointed out on the preceding pages.

ZANYSSON Rohwer

Nysson Spinola, Ann. soc. ent. France, x, p. 113, (1841).—Spinola (in Gay), Hist. fis. pol. Chile, Zool., vi, p. 347, (1851).—Cresson, Proc. Ent. Soc. Phila., iv, p. 145, (1865).—Gerstaecker [in part], Abh. Naturf. Ges. Halle, x, p. 69, (1866).—Cresson [in part], Trans. Amer. Ent. Soc., iv, p. 223, (1872).—Handlirsch [in part], Sitzber. Akad. Wissen. Wien, xcv, p. 297, (1887).—Fox [in part], Proc. Acad. Nat. Sci. Phila., xlvi, p. 303, (1894).—Reed [in part], An. Univ. Chile, lxxxv, p. 641, (1894). —Handlirsch [in part], Sitzber. Akad. Wissen. Wien, civ, p. 805, (1895). —Fox [in part], Journ. N. Y. Ent. Soc., iv, p. 12, (1896).—Kohl [in part], Ann. K. K. Naturhist. Hofmus. Wien, xi, p. 394, (1896).—Cockerell [in part], Proc. Davenport Acad. Nat Sci., vii, p. 143, (1898). —Cameron, Trans. Amer. Ent. Soc., xxxi, p. 374, (1905).—Viereck [in part], (in Smith) Ann. Rept. New Jersey St. Mus., 1909, p. 680, (1911). —Cameron, Timehri: Journ. R. Agr. Soc. Brit. Guiana, (3), ii, p. 430, (1912).—Brèthes [in part], An. Mus. Nac. Hist. Nat. Buenos Aires, xxiv, p. 136, (1913).

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[61] Sitzber. Akad. Wissen. Wien, xcv, p. 334, (1887).

[62] **Nysson decipiens** Arnold, Ann. Transvaal Mus., xiii, p. 225, (1929). [Zululand and Rhodesia, South Africa.]
Nysson decoratus Turner, Ann. & Mag. Nat. Hist., (8), xiv, p. 254, (1914). [India.]
Nysson dubitatus Turner, Ann. & Mag. Nat. Hist., (8), xiv, p. 255, (1914). [Coimbatore, India.]
Nysson Gregoryi Turner, Ann. & Mag. Nat. Hist., (8), ix, p. 52, (1912). [Nyomps Ndogo, British East Africa.]
Nysson Ludovici Turner, Ann. South Afric. Mus., xvii, p. 495, (1920). [South Africa.]
Nysson nasutus Cameron [in Sjostedt], Kilimandjaro-Meru Exp., viii, p. 293, (1910). [Meru Lowlands.]
Nysson rhodesiae Arnold, Ann. Transvaal Mus., xiii, p. 228, (1929). [Southern Rhodesia.]
Nysson rugosus Cameron, Mem. & Proc. Manchester Lit. & Phil. Soc., (4), iii, p. 242, pl. 10, figs. 13, 13a, (1890). [Barrackpore, India.]

Nysson ? F. Smith, Catal. Hymen. Brit. Mus., IV, p. 356, (1856).

Paranysson [*nec* Guérin] Cresson, Trans. Amer. Ent. Soc., IX, p. 273, (1882); Trans. Amer. Ent. Soc., XIV, Suppl., pp. 117 & 280, (1887).—Ashmead, Canad. Entom., XXXI, p. 326, (1899).—H. S. Smith, Univ. Nebraska Stud., VIII, p. 338, (1908).—Patton, Ohio Nat., IX, p. 443, (1909).—Schrottky [in part], Soc. Entom., XXV, p. 70, (1910).—Mickel, Univ. Nebraska Stud., XVIII, p. 350, (1918).

Nysson (*Paranysson*) [*nec* Guérin] Cameron, Biol. Centr.-Amer., Hymen., II, p. 70, (1889).

Nysson (*Zanysson*) Rohwer, Proc. U. S. Nat. Mus., LIX, p. 404, (1921).

Zanysson Pate, Mem. Amer. Ent. Soc., no. 9, p. 68, (1937).

GENOTYPE: *Nysson texanus* Cresson, 1872 [=*Nysson (Zanysson) texanus* Cresson = *Zanysson texanus* (Cresson)]. (By original designation of Rohwer.)

The genus *Zanysson*, related on the one hand to *Brachystegus* and on the other to *Metanysson*, represents an intermediate link in the evolution of the group to which they belong. The strongly dentate hind tibiae, the apically toothed femora, the bilobate postscutellum and the cristate front indicate the close relationship of the present genus to *Metanysson*, both having evolved in all probability from a common ancestral Brachystegoid stock. The chief characters differentiating these two from each other, as well as from the other genera of the tribe, have been given in the key to genera on a preceding page.

Generic Characters.—Head subcircular in anterior aspect, vertex arched, more or less convex; antennae filiform, distinctly 13-segmented in the males, 12-segmented in the females; antennal insertions overhung medially above by small frontal lobes; front convex, with a median longitudinal, often cristate, keel just above the antennal insertions.

Thorax with the scutellum either with strong reflexed lateral margins or with a sublamelloid lateral expansion there, anteriorly usually with a transverse, trough-like furrow which is usually densely pilose; postscutellum bilobed, *i. e.* with alate lamelloid lateral or posterior expansions; mesopleura anteriorly usually with an epicnemium, and dorsally just below the tegulae usually with a dentoid process or auriculate carina.

Legs with the hind femora armed apically beneath with a flat, truncate, subreniform dentoid process; hind tibiae serrate or serratodentate, usually with more than four teeth on the outer posterior margin; hind coxae with a sharp carina lengthwise on their opposing surfaces; fore tarsi of the females with vestiges of a comb comprised of a very few short, small spines at most.

Wings with three submarginal cells in the fore wing, the second petiolate and receiving both recurrent veins; hind wing with the cubitus arising far beyond the transverse median vein.

Abdomen more or less constricted between the first and second segments; second to fifth segments inclusive doubly margined and with silver or golden fimbriae apically, not dentate lateroapically; sternites of the males without long fringes of white hair medioapically; last tergite of the females not meeting on the mid-ventral line and thus enclosing the corresponding sternite; both sexes usually with a distinct pygidium, that of the female trigonal with the lateral margins simple, not serrulate, that of the male quadrate or rectangular and usually quadridentate, quinquedentate, or occasionally multidentate.

Nomenclatorial History.—Cresson applied Guérin's name Paranysson to this group in 1882,[63] and for many years most subsequent authors followed him, using it variously as a generic name or as a subgenus of *Nysson.* In 1914, however, Turner called attention to the fact that *Paranysson* Guérin, 1844 was applicable to the old world group of Miscophines which had hitherto been known as *Helioryctes* Smith, 1856, rather than to a genus of the Nyssonids.[64] Rohwer accepted Turner's findings and in 1921 proposed the name *Zanysson* for the group,[65] placing it tentatively as a subgenus of *Nysson.* The structure of the head, the scutellum and the postscutellum, and the character of the hind femora and tibiae offer ample justification, however, for according it full generic rank.

Distribution.—The genus Zanysson is largely if not entirely confined to the new world, reaching its greatest development in the Neotropical region where at present it is the dominant genus of the Nyssonini. Unlike *Foxia and Metanysson,* however, it seems to have invaded the Nearctic realm very successfully, being well distributed throughout the upper as well as the lower austral zones of the United States.

Species of Genus.—This genus comprises the Texanus Group [66] of Handlirsch. So far seventeen species have been described which are referable to it; of these thirteen are neotropical and four nearctic. A synopsis of *Zanysson* will be presented later in another paper of this general series. The following four new forms are now before me and are described herewith.

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[63] Trans. Amer. Ent. Soc., IX, p. 273, (1882); *v. et.* Patton: Ohio Naturalist, IX, p. 443, (1909).

[64] Ann. & Mag. Nat. Hist., (8), XIV, pp. 338-340, (1914).

[65] Proc. U. S. Nat. Mus., LIX, p. 404, (1921).

[66] Sitzber. Akad. Wissen. Wien, XCV, pp. 297-318, (1887).

Zanysson matinecoc [67] new species

The present form is somewhat intermediate between *Zanysson texanus* (Cresson) and *Z. plesius* Rohwer but is readily separable from both by the smaller size, the strongly tuberculate ocellar area, the different sculpturing of the thorax and propodeum and the dissimilarity in shape and puncturation of the pygidium.

Type.— ♂ ; Cold Spring Harbor, Suffolk County, Long Island, New York, August 9, 1926, [Academy of Natural Sciences of Philadelphia, Type no. 4191].

Male.—6 mm. long. Black; mandibles medially, femora apically, all tibiae and tarsi, fulvous; scape apically, all femora, tegulae and axillary sclerites, dark brown; first two abdominal tergites latero-apically on each side with an elongate yellowish-white macula. Wings hyaline, lightly and rather evenly infumated with light brown; veins fuscous.

Head with rather long, very light golden pubescence which is appressed and most conspicuous on clypeus, inner orbits and at the dorsal margin of the frontal crista; dorsal surface of pronotum with a transverse band of heavy, appressed, golden pubescence; mesonotum and mesopleura with decumbent aeneous hairs, the mesopleura dorsally just below tegulae with pilosity like that of dorsal surface of pronotum; anterior trough of scutellum, postscutellum laterally, and lateral areas of dorsal surface of propodeum with appressed golden pubescence; abdomen with fine, short, inconspicuous, appressed pubescence and longer, scattered, reclinate setulae; apical margins of tergites and sternites with very fine, short fimbriae of hairs, those of tergites light golden, those of sternites silvery; legs clothed with fine, appressed, short, inconspicuous pubescence and longer decumbent setulae, especially the tibiae.

Head with close, rather coarse pit-like punctures; clypeus flat, apical margin subtruncate, not bevelate but provided medially just before apex with a small tubercle; frontal keel pronounced, cristate, about three-fourths the length of the scape; antennae with scapes obterete, pedicel subglobose, first flagellar article one-half the length of the second, last flagellar segment elongate, terete, simple, not excavate beneath nor truncate apically; ocell-ocular line about twice the length of the postocellar line; posterior ocelli with inner margins distinctly tuberculate, the tubercles punctate and separated from each other by a median longitudinal sulcus; temporal carinae wanting; occipital carinae present and ending ventrally in a distinct tooth in gular region.

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[67] After the Matinecoc Indians who formerly dwelt in the region from which the types came.

Thorax with the anterior dorsal margin of pronotum rounded, lateral angles acutely dentate, dorsal surface with a transverse sulcus; mesonotum coarsely, clathrately pitted, medially with a suggestion of a broad, shallow longitudinal sulcus; scutellum rugosely pitted, with the lateral margins strongly raised into subalate lamellate lateral expansions which at the posterior lateral corners are bluntly dentate; postscutellum clathrately pitted like scutellum, bilobate, the lobes subtrigonal, bluntly dentate and directed caudad; mesopleura very coarsely and irregularly clathrately pitted, anteriorly with an epicnemium and dorsally just below tegulae with an acute, conspicuous tubercle; mesosternum weakly margined anteriorly; metapleura and anterior portion of the lateral faces of propodeum nitidous, the former dorsally with a carinula subparallel to the dorsal flanged margin, the upper caudal portion of the latter coarsely, clathrately areolate; dorsal face of propodeum with a trapeziform median area bisected by a median longitudinal carinula which forks posteriorly to form the anterior margin of a transverse subclepsydrate areole which is nitidous within, laterad of median bisecting carinula with several elongate oblique areolets; posterior face with a median infundibuliform areolet, the dorsal margin of which fits into the posterior margin of the subclepsydrate areolet, laterad of median areolet with a pair of elongate areoles delimited by carinulae subparallel to those delimiting the lateral margins of the median infundibuliform areole, the surface within all the areoles shining and rugulose. Hind tibiae with eight to nine teeth.

Abdomen shining, with a fine, regular, rather sparse acupuncturation upon which is superposed a series of coarser, larger punctures that are closest and strongest on first tergite and second sternite but which become progressively weaker and fewer on each succeeding segment; penult tergite without dorso-lateral teeth apically; pygidium subquadrate, quadridentate, discally with fine close acupuncturation and heavy, coarse, close punctures.

Allotype.—♀; same data as type; [Academy of Natural Sciences of Philadelphia].

Female.—Similar to male except as follows: all legs distad of coxae fulvous. Clypeus with apical margin broadly and very shallowly arcuate medially; apically with a sharply inflexed, narrow, transverse bevel, the upper margin of which is distinctly edged, faintly arcuate and projects over bevel. Pronotum subcarinate along the anterior dorsal margin. Median dorsal area of propodeum bisected by two close parallel longitudinal carinulae, laterad of which diverge on each side carinulae enclosing an elongate right angled trigonal areolet, subclepsydrate area wanting. Pygidium elongate oval, the disc very finely and closely acupunctate upon which is superposed a series of moderately close and coarser punctures, not punctatostriate.

Remarks.—Despite a certain amount of disparity in form as noted above, I believe that the male and female described here represent opposite sexes of the same species. Both specimens were taken at the same time and place, and indeed may have even been *in copula* although I have no data to support this thesis.

The present form is the most northernly distributed species of the genus *Zanysson* on the Atlantic seaboard known to me.

Zanysson chichimeca [68] new species

The present species differs from the other known middle American species of *Zanysson* by the microscopically punctate pygidium clothed with decumbent argenteous pile and by the clypeus being squarely truncate apically and provided with an abruptly inflexed, concave, nitidous bevel there.

Type.— ♀ ; Guadalajara, Jalisco, Mexico, September 14, 1903, (J. F. McClendon; " in the ravine of the Santiago [*i.e.* the Rio Grande de Santiago] and some deserted parks "),[69] [Academy of Natural Sciences of Philadelphia, Type no. 4178].

Female.—9 mm. long. Black; mandibles dark red medially, apices golden yellow; labrum red; tip of scape fulvous; legs fuscous, the tegulae, tibiae and femora apically, fore tibiae anteriorly, all tarsi beneath fulvoferruginous. First four abdominal tergites laterally on each side with an elongate, transverse lemon-yellow macula. Wings hyaline somewhat infumated in marginal cell and at apices; veins fuscous.

Head clothed with appressed, short, light golden pubescence, heavy and quite noticeable on clypeus and inner orbits of eyes, rather sparse on face, vertex and temples which also bear erect light aeneous hairs. Pronotum posteriorly with a transverse band, scutellum anteriorly in the transverse trough, postscutellum laterally, and lateral areas of the dorsal face of the propodeum with heavy appressed golden pubescence. Mesonotum with inconspicuous, short, decumbent aeneous hairs; mesopleura, sterna and coxae with sparse silvery pubescence. Abdominal tergites with very short, appressed golden pubescence becoming silvery on the sternites which also bear longer reclivous silvery hairs; first five tergites with apical golden fimbriae which become silvery on the second to fifth sternites; legs with short, appressed silvery pubescence, the lower and inner sides of the femora and the posterior outer margins of the tibiae, particularly the hind pair, with declivent silvery setae.

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[68] After the Chichimeca, a group of north Mexican Indian tribes.

[69] *Vide* Biol. Centr.-Amer., Neuropt.: Intro. Odonata, p. vii, (1908); *v. et.* Ent. News, XVII, pp. 26-27, (1906).

Head with fine basic acupuncturation upon which on face, vertex and temples is superposed a series of close, moderately coarse pit-like punctures; clypeus flat and with a narrow, transverse, abruptly inflexed, nitidous, impunctate bevel apically, the upper and lower margins of which are squarely truncate; postocellar line about one-half the length of the ocell-ocular line; inner margins of the posterior ocelli tuberculate, the tubercles semi-opaque, punctate, and separated from each other by a moderate, median longitudinal sulcus; temporal carinae wanting above, slightly developed below; occipital carinae present; antennae with the first flagellar article one-half the length of the second.

Thorax with the pronotum transversely subcarinate along the anterior dorsal margin, thence roundly declivous to neck, lateral dorsal angles acutely dentate, dorsal surface with a shallow transverse furrow; mesonotum pitted, somewhat more coarsely so than face, anteriorly with a lightly impressed median longitudinal line; scutellum rugosely pitted, the lateral margins strongly reflexed; postscutellum with the lobes small, subtrigonal, and directed caudad; mesopleura very coarsely and shallowly pitted, anteriorly with an epicnemium, dorsally below the tegulae with a small compressed tubercle; metapleura and lower anterior portion of the lateral faces of the propodeum shining and impunctate, the upper posterior portion of the latter coarsely and shallowly clathrately areolate; dorsal face of the propodeum glabrous, shining and irregularly areolate discally; posterior face of propodeum glabrous, shining, and medially with a cuneate area laterad of which on each side are two elongate, oblique subrectangular areoles. Hind tibiae with ten teeth.

Abdomen with the first two tergites and second sternite with an irregular series of pits like mesonotum but more scattered, remaining tergites and sternites with very fine puncturation although along the posterior margins with a few irregularly scattered heavy punctures; pygidium elongate oval, the disc with very fine, close acupuncturation making it appear subgranulose and clothed with very fine decumbent argenteous pile; lateral faces of last tergite biserially punctate.

Male.—Unknown.

This species is known to me only from the unique female.

Zanysson changuina[70] new species (Pl. VIII, fig. 24.)

The present species is very closely allied to *Z. dives* (Handlirsch), but may be differentiated from that form by the fact that the third submarginal cell of the fore wing does not extend beyond the apex of the marginal cell, the metapleura have but two subparallel horizontal carinulae dorsally, the lateral faces of the propodeum are irregularly areolated dorso-caudad rather than punctate, and the pygidial teeth are relatively longer and more spinoid with the median tooth much better developed.

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[70] After the Changuina Indians of northeastern Panama.

Type.—♂; Changuinola District, Bocas del Toro, Panama, April 21, 1924, (J. C. Bradley), [Cornell University, Type no. 1466].

Male.—6.5 mm. long. Black; the following rufous: labrum, mandibles basally, scapes apically, pedicel, prothoracic tubercles posteriorly, tegulae and axillary sclerites, mesonotal laminae posteriorly, legs distad of the coxae (the last tarsal segment fuscous), first two abdominal tergites basally and laterally, and the first three abdominal tergites narrowly along the apical margins. First two abdominal tergites laterally on each side with a narrow, transverse, elongate yellow spot. Wings hyaline, somewhat infumated, the marginal and median cells of the fore wing infuscated apically; veins dark brown.

Clypeus and base of mandibles densely clothed with appressed silvery pubescence; inner orbits of eyes with a broad band of appressed light golden pubescence, remainder of face more thinly clothed; disc of face, vertex and occiput with erect, rather long, aeneous hairs; temples to temporal carinae with appressed light golden pubescence, between temporal and occipital carinae with shaggy, long golden pubescence. Dorsal surface of pronotum thickly clothed with bright golden pubescence; mesonotum with short, reclinate, inconspicuous aeneous pubescence and longer suberect dark hairs, medially with a longitudinal stripe of bright golden pubescence; anterior scutellar trough, postscutellum medially and laterally, and lateral areas of the dorsal face of the propodeum with appressed, bright golden pubescence; mesopleura and legs thinly clothed with fine, appressed silvery pubescence and sparse and scattered longer, erect, setose silvery hairs; metapleura with very fine scattered decumbent silvery pubescence becoming golden in colour on the posterior half of the lateral faces of the propodeum. Abdomen thinly clothed with fine appressed, short aeneous pubescence on the tergites, the sternites more heavily and noticeably clothed with silvery pubescence and a sparse, scattered series of longer, reclinate, golden hairs; the tergites and sternites with apical fimbriae of bright gold.

Head with a very fine acupuncturation upon which is superposed a series of rather coarse pit-like punctures; frontal keel cristate, short, about as long as scape; ocellocular line about twice the length of the postocellar line, the inner margins of the posterior ocelli not tuberculate but distinctly tumid; temporal and occipital carinae present, strong and well developed, the latter ending ventrally in a strong gular spine; antennae with the first flagellar article less than one-half the length of the second, the last segment simple, cylindrical, not excavate beneath; clypeus flat discally, subtruncate and with a fine beading apically, not bevelate there, medially just before apex with a small tubercle.

Thorax with the pronotum transversely subcarinate medially, lateral angles acutely dentate, dorsal surface with a shallow, transverse sulcus posteriorly; mesonotum somewhat more coarsely pitted than vertex, anteriorly with a lightly impressed median longitudinal line; scutellum with the lateral margins strongly raised into subalate lamellate lateral expansions which at each posterior lateral corner are bluntly dentate; postscutellum clathrately pitted like scutellum, bilobate, the lobes subtrigonal, bluntly dentate and directed caudad; mesopleura very coarsely, irregularly and clathrately pitted, dorsally below the tegulae with an elongate compressed tubercle, anteriorly with an epicnemium; mesosternum weakly margined anteriorly, and together with the metasternum finely pitted; metapleura and anterior portion of the lateral faces of the propodeum shining, highly polished, and impunctate, the former with two longitudinal, horizontal, subparallel rugulae dorsally, caudal portion of the lateral faces of the propodeum irregularly and weakly areolated. Propodeum with a trapeziform enclosure dorsally, the lateral margins of which converge posteriorly, medially with an obovate areole divided by a longitudinal carina which forks posteriorly, laterad of the median obovate enclosure with an oblique carina on each side, caudad of the median obovate enclosure is a transverse series of three areoles, delimited by strong carinulae, the median areolet elongate rectangular, the lateral ones subcordate; posterior face of propodeum more or less glabrous discally, medially with a cuneate areole laterad of which on each side is a divergent carinula well separated from and subparallel to the lateral carinula of the median cuneate areole; propodeal spines elongate. Hind tibiae with eight to ten teeth on the posterior margin.

Abdomen shining, with minute, well separated acupuncturation basically upon which is superposed a very sparse and scattered series of coarser punctures; second sternite coarsely punctate and obtusely angulate in lateral aspect; pygidium quinquedentate, the inner lateral tooth spinoid and the longest, discally with fine close puncturation upon which is superposed a few scattered coarse punctures.

Female.—Unknown.

Paratypes.—3 ♂; same data as type.

Zanysson macuxi[71] new species

This species is apparently most closely related to *Zanysson varipilosellus* (Cameron) but differs from that form in the areolation of the propodeum, the shape and puncturation of the pygidium, and the structure of the scutellum and clypeus.

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[71] After the Macuxi Indians of the Rio Branco region in Brazil.

Type.—♀; Vista Alegre,[72] Rio Branco, Amazonas, Brazil, September 6, 1924, (J. Bequaert), [Museum of Comparative Zoology].

Female.—8 mm. long. Black; mandibles fulvous, apices red; the following fulvoferrugineous: antennal scapes, pedicels, and first segment of the flagellum, prothoracic tubercles, tegulae, axillary sclerites, mesonotal laminae posteriorly, legs exclusive of the coxae, first two abdominal tergites basally, laterally and apically, third to fifth tergites apically, sixth tergite laterally, second to fifth sternites apically and sixth sternite entirely. First abdominal tergite laterally on each side with an elongate transverse yellow macula preapically. Wings hyaline, infumated, the veins dark brown.

Head with appressed, silky, very light golden pubescence on clypeus, face and temples, turning to aeneous just below the median ocellus and on the vertex; face, vertex and temples with short, erect, light golden hairs. Thorax more sparsely clothed with appressed, silvery pile in general; dorsal face of the pronotum, a median longitudinal stripe on mesonotum, mesopleura with a narrow vertical stripe anteriorly and posteriorly, anterior scutellar trough, postscutellum, and lateral areas of the dorsal surface of the propodeum with heavy, appressed, light golden pubescence; mesonotum with appressed light aeneous pubescence. Abdomen with sparse, very short, light golden to cupreous pubescence becoming silvery on the sternites which also have scattered, erect, short silvery hairs; tergites and sternites with bright golden fimbriae apically. Legs sparsely clothed with appressed silvery pubescence; tibiae and tarsi rather heavily setose.

Head with a very fine basic acupuncturation upon which is superposed a heavy, coarser, well separated series of punctures; clypeus flat discally, broadly and shallowly arcuate apically, and provided there with a concave, nitidous, impunctate bevel, the upper margin of which is straight and tends to overhang somewhat the bevel; front with the median longitudinal keel cristate and as long as the scapes; ocelli arranged in a curved line, the inner margins of the posterior ocelli tumid but not tuberculate, the postocellar line about two thirds the length of the ocellocular line; temporal and occipital carinae well developed, the latter ending ventrally in a small blunt spine in gular region.

Thorax with anterior margin of dorsal surface of pronotum shallowly bisinuate and obscurely subcarinate, acutely dentate above and below at the lateral angles; dorsally with a shallow transverse trough; mesopleura and mesonotum with moderately large, well separated pits; mesonotum with a median longitudinal furrow; mesopleura anteriorly with an epicnemium, and dorsally below the tegulae with a sharp compressed tubercle; scutellum clathrately rugulose, strongly margined laterally; postscutellum bilobate, the lobes subtrigonal, bluntly dentate, suberect and directed caudad; metapleura and lateral faces of the propodeum nitidous, longitudinally rugulose above, the latter obscurely areolated dorso-caudad. Propodeum with the dorsal face glabrous, highly polished and impunctate medially, immediately following the postscutellum with a subtrapeziform area divided into a transverse series of elongate subrectangular areolets by longitudinal carinulae, the median one bifurcating posteriorly, caudad of this series with three rather large transverse areoles, the median one subquadrate, the lateral ones subcordate; posterior surface of propodeum with a median cuneate enclosure laterad of which on each side are two elongate subrectangular areolets. Hind tibiae with nine teeth.

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[72] Approximate locality: 1° 44′ 7″ N., 61° 8′ 32″ W. For an account of this region see: Richard P. Strong *et al.*, Medical Report of the Hamilton Rice Seventh Expedition to the Amazon, in conjunction with the Department of Tropical Medicine of Harvard University, 1924-1925. *Contributions from the Harvard Institute for Tropical Medicine and Biology*, no. 4, xvi+313 pp., illus., Cambridge, Harvard University Press, 1926.

Abdomen shining, with a fine close acupuncturation upon which is superposed a scattered series of heavier punctures on the first two tergites and second sternite, the latter obtusely angulate in lateral aspect; pygidium elongate trigonal, the lateral margins arcuate, the apex bluntly rounded, the disc very finely acupunctate throughout.

Male.—Unknown.

Paratype.—1 ♀; same data as type.

The type and paratype are the only specimens as yet known of this distinctive species. The acquisition of additional material, particularly of the males, is awaited with interest.

METANYSSON Ashmead

? *Acanthostethus* Smith, Trans. Ent. Soc. London, 1869, p. 306, (1869).
Nysson Cockerell, Trans. Amer. Ent. Soc., xxii, p. 294, (1895).
Metanysson Ashmead, Canad. Entom., xxxi, p. 326, (1899).—Pate, Mem. Amer. Ent. Soc., no. 9, p. 39, (1937).

GENOTYPE: *Nysson solani* Cockerell, 1895 [=*Metanysson solani* (Cockerell) = *Metanysson (Metanysson) solani* (Cockerell)]. (Monobasic and by original designation of Ashmead.)

The distinctive venation of the fore wing, the quadridentate hind tibiae and the specialized character of the last abdominal tergite and sternite of the female immediately differentiate *Metanysson* from all the other genera of the Nyssonini. This genus represents the culminating point of the *Brachystegus-Zanysson* evolutionary line and is without question the most highly developed group of the Nyssonid complex.

Generic Characters.—Head subcircular in anterior aspect, vertex arched, convex above; antennae filiform to subclavate, distinctly 13-segmented in the males and 12-segmented in the females; antennal insertions overhung medially above by small frontal lobes; front convex, tuberculate or with a longitudinal median cristate keel just above the antennal insertions.

Thorax with the scutellum if margined laterally without strong reflexed rims, anteriorly without a trough separating it from the mesonotum, but laterally on each side with a small transverse trigonal, non-pubescent pit or fovea; postscutellum simple or with a pair of small spinoid projections, occasionally sublobate; mesopleura without an epicnemium anteriorly, and dorsally just below the tegulae without spines, tubercles, or an auriculate carina; metapleura ankylosed with the lateral faces of the propodeum.

Legs with the hind femora armed apically beneath with a small truncate subreniform process as in *Zanysson;* hind tibiae strongly quadridentate on their outer posterior margins; fore tarsi of the females without a tarsal comb.

Wings with only two submarginal cells in the fore wings due to the atrophy of the first ordinate (*i.e.* the free portion) of the first transverse cubital vein, the second ordinate (*i.e.* the anterior portion) coalesced with the second transverse cubital vein as usual, the apparent first submarginal cell thus receiving both recurrent veins, except in *Huachuca;* hind wings with the cubital vein arising far beyond the transverse median vein.

Abdomen with a moderate constriction between the first and second tergites; second to fifth segments strongly, evenly and coarsely fimbriate apically; males with the second to fifth sternites with a long fringe of white hairs medio-apically, and with the penult tergite dorso-laterally dentate apically on each side; females with the lateral margins of the last tergite meeting on the mid-ventral line and thus enclosing the corresponding sternite which is strongly compressed and provided with a strong median longitudinal keel ventrally; both sexes with a distinct pygidium, that of the males quadrate or rectangular, the apex bidentate, tridentate, or multidentate, that of the females elongate trigonal in shape with the lateral margins usually serrulate.

Remarks.—Fox having seen but one specimen of this genus, the type of *Nysson solani* Cockerell, expressed the opinion that the venational peculiarity exhibited in the fore wing of *Metanysson* might be a teratological phenomenon,[73] a view with which Patton concurred some years later.[74] However, in all the specimens of *Metanysson* I have seen, the venation has been found to be remarkably constant. Moreover, a more intensive study of the several species of *Metanysson* has disclosed numerous additional characters as set forth in the foregoing keys and generic characterization which indubitably entitle this group to be accorded the rank of a discrete genus and indicate without shadow of doubt that it represents a natural group and not merely an artificial product of the taxonomic mind. The curious and interesting structure of the last abdominal tergite and sternite of the female is unique in the tribe and subfamily, or for that matter in the Sphecoids as a whole.

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[73] Trans. Amer. Ent. Soc., XXII, p. 295, (1895); *v. et.*, Journ. N. Y. Ent. Soc., IV, p. 13, (1896).

[74] Ohio Naturalist, IX, p. 442, (1909).

Synonymical notes.—As indicated on a foregoing page, *Acanthostethus* Smith may be the correct name that should be applied to this genus, but I have seen no material of the genotype, *Acanthostethus basalis* Smith, 1869 [= ? *Nysson mysticus* Gerstaecker, 1866 = *Acanthostethus mysticus* (Gerstaecker)], nor for that matter any Australian material of this group. I know the forms of this region only from the descriptions of Smith and Turner, and insofar as I can gather from their papers, it would appear that the species of this region may belong to two or more genera. Turner has been responsible for the definition and description of most of the Australian Nyssonids, but while his characterizations may be admirably adapted for the determination of the species of that region, nevertheless they are too poorly designed to be properly fitted into a broad classification of the genera of the world without further study of the original material. Consequently, until Smith's and Turner's types, now in British Museum, are studied in the light of the evidence presented here, I propose to use Ashmead's name *Metanysson* for this group. There is not the slightest doubt in my mind that Cockerell is correct in stating that *Acanthostethus* should be accorded generic rank.[75]

Distribution.—So far as known, *Metanysson* is a group confined entirely to the new world with the possible exception of Australia as indicated above. The genus reaches its greatest development in the Neotropical region, invading the Nearctic realm apparently only in the lower sonoran zone of the southwestern United States.

Subgenera.—There are two well marked groups within the genus which I believe are worthy of being accorded subgeneric rank. They may be readily separated by means of the following table.

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[75] Mem. Queensland Mus., x, p. 118, (1932).

Key to the Subgenera of Metanysson

Fore wing with the apparent first submarginal cell receiving both recurrent veins; the apparent first transverse cubital vein more or less angulate. *Metanysson* Ashmead

Fore wing with the second recurrent vein received by the apparent second submarginal cell; the apparent first transverse cubital vein straight. *Huachuca* new subgenus

Subgenus **METANYSSON** Ashmead

Nysson Cockerell, Trans. Amer. Ent. Soc., XXII, p. 294, (1895).—Fox [in part], Journ. N. Y. Ent. Soc., IV, p. 13, (1896).—Cockerell [in part], Proc. Davenport Acad. Nat. Sci., VII, p. 143, (1898).—Ducke, Zeitschr. Hymen. Dipt., IV, p. 90, (1904).—Patton [in part], Ohio Nat., IX, p. 442, (1909).

Metanysson Ashmead, Canad. Entom., XXXI, p. 326, (1899).—Pate, Mem. Amer. Ent. Soc., no. 9, p. 39, (1937).

Paranysson (Metanysson) Schrottky, Soc. Entom., XXV, p. 70, (1910).

Nysson (Metanysson) Rohwer, Proc. U. S. Nat. Mus., LIX, p. 404, (1921).

GENOTYPE: *Nysson solani* Cockerell, 1895 [=*Metanysson (Metanysson) solani* (Cockerell)].

In a subgeneric sense the name *Metanysson* is restricted to that group of species containing the genotype, *Nysson solani* Cockerell, and agreeing with it by having both recurrent veins of the fore wing received by the apparent first submarginal cell and by the first transverse cubital vein being more or less angulate. It is obviously the more generalized of the two subgenera recognized here.

Species of Subgenus.—The species known to me that are referable to this subgenus are *M. (Metanysson) solani* (Cockerell) and *layano, yavapai, coahuila* and *lipan* described as new on the following pages. In addition, two neotropical forms—*Nysson Alfkeni* Ducke and *Paraysson (Metanysson) catamarcensis* Schrottky, belong to this subgenus in all probability. Although I have seen no material of either of these latter species, nevertheless their descriptions indicate that they are presumably assignable to *Metanysson.*

Key to the Species of Subgenus Metanysson

1. Males 2
 Females 7
2. Postscutellum simple 3
 Postscutellum armed with spines or sublobate 5
3. Ocellar area not tuberculate; pygidium quinquedentate; (Brazil).
 , *layano* new species
 Ocellar area strongly tuberculate; pygidium novendentate 4
4. Abdomen entirely black; ocellar tubercles high, overhanging the posterior ocelli laterally and projecting anteriorly over the median ocellus; teeth of hind tibiae evenly spaced; (Arizona).
 yavapai new species
 Abdomen with the first two segments red, remainder black; ocellar tubercles low, not overhanging the posterior ocelli laterally nor projecting anteriorly over the median ocellus; second and third teeth of hind tibiae contiguous at base; (Texas) ....*lipan* new species
5. Pygidium novendentate; postscutellum armed with two small erect spines; basal abdominal segments red; (New Mexico and Arizona).
 solani (Cockerell)
 Pygidium tri- or quinquedenate 6
6. Pygidium quinquedentate; second abdominal sternite with a small tubercle at base; abdomen entirely black; (Argentina).
 catamarcensis (Schrottky)
 Pygidium tridentate; second abdominal sternite without a small tubercle at base; basal abdominal segments red; (Brazil) ....*Alfkeni* (Ducke)
7. Postscutellum simple; ocellar area strongly tuberculate, the tubercles overhanging the posterior ocelli laterally and projecting anteriorly over the median ocellus; (Arizona) ....*yavapai* new species
 Postscutellum with spines or sublobate; ocellar area weakly tuberculate at most 8
8. Postscutellum with two small erect spines; (New Mexico and Arizona).
 solani (Cockerell)
 Postscutellum indistinctly bilobed 9
9. Clypeus with the apical margin truncate; mesonotum without a median longitudinal sulcus; (California) ....*coahuila* new species
 Clypeus with the apical margin sinuate; mesonotum with a median longitudinal sulcus; (Brazil) ....*Alfkeni* (Ducke)

Metanysson (Metanysson) layano[76] new species (Pl. VIII, fig. 20.)

This species is separable from all the other known forms of *Metanysson* except *lipan* and *yavapai* by the simple, unarmed postscutellum. In *layano* the ocellar area of the vertex is non-tuberculate whereas in *yavapai* and *lipan* this area is very strongly tuberculate. The foregoing key will serve to separate the present species from all others in this genus.

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[76] After the Layano Indians of the Matto Grosso, Brazil.

Type.—♂; Aquidauana, Matto Grosso, Brazil, December 11-13, 1919, (R. C. Harris), [Cornell University].

Male.—4 mm. long. Black; mandibles medially, fore and middle tarsi, hind femora, all tibiae and tarsi, fulvous. Wings clear hyaline, slightly infumated in the stigmatal region; veins dark fuscous.

Head sparsely clothed with scattered, short, erect hairs; clypeus with silky, appressed silvery pubescence. Thorax and abdomen with short, sparse, scattered hairs similar to head, but in addition, particularly on the tergites, with short, appressed silvery pubescence. Legs with very fine appressed puberulent pubescence, and sparse, scattered, short erect hairs.

Head deeply and coarsely punctate; vertex and occiput punctatostriate; clypeus transverse, subtruncate apically, the apical margin broadly, shallowly excavate, and with a transverse, deep and roundly concave bevel, the upper margin of which is transverse and sharply cristate and overhangs somewhat the concave portion; front with a low median longitudinal keel for about one-half its length; temporal carina indistinct owing to the coarse, heavy puncturation of this area; ocellar area not tuberculate, the posterior ocelli with their inner margins slightly tumid; antennae with the scape cylindrical, the pedicel subglobose, the flagellum subclavate apically, the last flagellar article simple, elongate, not excavate beneath.

Thorax with the pronotum, mesonotum and mesopleura coarsely, deeply and irregularly punctured. Pronotum acutely dentate laterally, anterior dorsal margin rounded except medially where it is transverse carinate for a short distance. Mesonotum with a trace of a broad, shallow, longitudinal sulcus medially. Scutellum and postscutellum rugo-punctate, the scutellum indistinctly margined laterally, the postscutellum simple, unarmed. Mesopleura rounded anteriorly, without an epicnemium. Propodeum dorsally with a median longitudinal carina forking posteriorly and passing ventrad on the posterior face to unite again at base and thus form a cuneate enclosure on the posterior face; laterad of each carinula bounding the central cuneate areolet is another forming a trigonal areolet on each side of the median cuneate areolet, the surface of the areolets opaque and transversely striolate; laterad of the median carina on the dorsal face, the propodeum is irregularly areolated; lateral faces of the propodeum weakly and irregularly areolated, shining anterio-dorsally, remainder semi-opaque.

Abdomen with scattered puncturation, the punctures of the first five tergites much finer than those of head and thorax, and denser apically than basally, the sixth and seventh tergites dorsolaterally dentate apically on each side; first five tergites and sternites furnished with a coarse and heavy golden fimbria apically, that of the second to fifth sternites inclusive narrowly interrupted medially by the medio-apical fringe of long, white hairs; sternites shining, with an irregularly scattered, sparse punctuation coarser than that of the tergites; pygidium quinquedentate.

Female.—Unknown.

This species is known only from the unique type. The acquisition of further material, particularly of the female sex, is awaited with much interest.

Metanysson (Metanysson) lipan[77] new species (Pl. VII, fig. 12.)

The present species agrees with *yavapai* in having the postscutellum simple and the male pygidium novendentate. Like that species, the ocellar area is tuberculate but in *lipan* the tubercles are relatively low and simple and do not overhang the posterior ocelli nor have a distinct dentoid process projecting anteriorly over the median ocellus. Whereas, moreover, the abdomen is entirely black in *yavapai*, the first two abdominal segments are ferruginous in *lipan* thus causing the latter to superficially resemble *solani*, a resemblance which is further strengthened by the fact that in both the pygidium of the males is novendentate and the ocellar area more or less tuberculate. However, *lipan* may be readily separated from *solani* by the simple, non-spinose postscutellum and from both *yavapai* and *solani* by the simple declivous subbevelate apical margin of the clypeus and by the second and third teeth of the hind tibiae being contiguous at the base.

Type.— ♂ ; Sierra Blanca, Hudspeth County,[78] Texas, elevation 4509 feet, July 8, 1917,[79] (Joseph Bequaert), [Museum of Comparative Zoology].

Male.—7 mm. long. Black: labrum and mandibles fulvous, the apices of the latter red; fore and middle femora apically, all tibiae and tarsi and hind femora entirely, russet; scapes, fore and middle femora and middle and hind coxae and last four abdominal sternites, dark brown; first two abdominal segments ferruginous. Wings clear hyaline, infuscated anteriorly in the marginal cell; veins dark brown.

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[77] After the Lipan Indians who formerly inhabited western Texas.

[78] The pin label on the specimen reads "Sierra Blanca, El Paso County, Texas." Since this material was taken, the old county of El Paso has been divided into the present El Paso and Hudspeth Counties.

[79] *Vide* Bradley [1919, *Scientific Monthly*, VIII, p. 413] for an account of this region.

Head with short, appressed silvery pubescence which is most conspicuous on clypeus and lower part of face; thorax similarly clothed, the pronotum, mesopleura dorsally and the postscutellum more heavily clothed than mesonotum and scutellum; lateral areas of dorsal face of propodeum densely clothed with appressed silvery pubescence; abdomen and legs with fine inconspicuous pubescence, the former with conspicuous, narrow silvery pubescent fasciae apically on first five tergites and first four sternites.

Head with fine acupuncturation upon which is superposed a series of coarser, rather close punctures; clypeus transverse, gently tumid, apically with a declivent subbevelate area, the upper margin of which is not edged and the apical margin very shallowly and broadly arcuate medially, provided medially and apically with a transverse, irregular row of stiff, light aeneous setae; front with the median crista short, about three-fourths the length of scape; temporal carina absent; no spines or tubercles in gular region; ocellocular line about twice the length of the postocellar line; inner margins of each posterior ocellus with a simple, elongate, shining and punctate tubercle separated from each other by a median longitudinal cleft; scapes terete, pedicels subglobose, flagellum subclavate apically, the last segment longer than the preceding article and simple, not curved nor excised beneath.

Thorax with a fine basic acupuncturation upon which is superposed a series of irregular, close, rather deep pits; pronotum with the anterior dorsal margin rounded, the lateral angles sharply rectangular, below these at level of neck with an elongate, sideward projecting, spinous tubercle, posterior margin of pronotum very broadly and shallowly angulate cephalad; mesonotum with an impressed, narrow, fine median longitudinal line; scutellum very weakly margined laterally, each anterior lateral corner with a very narrow, elongate, transverse trigonal, nonpubescent fovea; postscutellum convex, simple, unarmed; mesopleura rounded anteriorly, without an epicnemium; metapleura glabrous, shining, lower half nitidous, upper half longitudinally striate. Propodeum on dorsal face with a median trapezoidal, glabrous and shining area which is provided with weakly delimited, elongate areoles, the median series longitudinal, the lateral ones transverse; lateral faces glabrous and nitidous at lower anterior corners to finely punctate and obliquely striate at upper posterior angles; posterior face glabrous with a median cuneate areole above which is a transverse concave area. Hind tibiae with the two median teeth contiguous basally. Fore wings with the second transverse cubital vein distinctly angulate, the second recurrent vein almost interstitial with it.

Abdomen shining, with a fine scattered basic acupuncturation upon which is superposed a series of large, rather coarse and irregularly scattered punctures; apical margins of second to fifth segments with strong, regular fimbriae, which are narrowly interrupted medially on sternites by the medio-apical fringes of long white hairs; fourth and fifth sternites with an elongate transverse welt latero-apically on each side; penult tergite with a strong caudad projecting tooth latero-apically on each side; pygidium subquadrate, somewhat longer than wide, novendentate with the disc coarsely punctured.

Female.—Unknown.

The species is known only from the unique type. The acquisition of further material, particularly of the female sex, is awaited with much interest.

Metanysson (Metanysson) yavapai[80] new species

(Pl. VII, figs. 2, 10, 11.)

Like *layano* and *lipan,* the present species has the postscutellum simple and unarmed but differs from the former by the tuberculate ocellar area and the novendentate pygidium, characters which it possesses in common with *lipan.* From that species, however, *yavapai* is readily distinguished by the entirely black abdomen, the evenly spaced teeth on the hind tibiae, and the high ocellar tubercles which overhang the median and posterior ocelli.

Type.— ♀ ; Toltec, Pinal county, Arizona, elevation 1200 feet, August 23, 1937, (Rehn, Pate & Rehn), [Academy of Natural Sciences of Philadelphia, Type no. 4181].

Female. — 7 mm. long. Black; mandibles fulvous, apices red; tarsi fulvous. Wings hyaline, somewhat infumated along the costa and in the marginal cell; veins dark fuscous.

Clypeus heavily clothed with appressed silvery pubescence; face and vertex more sparsely clothed with appressed, very light golden pubescence; dorsal surface of pronotum and tubercles with heavy, appressed light golden pubescence; mesonotum with short, decumbent, aeneous pubescence; scutellum and postscutellum with short, appressed, light golden pubescence; mesosternum, metasternum and coxae with heavy, short, appressed, silvery pubescence; legs with very fine, appressed, short, silvery pubescence and scattered, short fine erect setulae; dorsal face of propodeum glabrous medially but heavily clothed laterally to bases of the spines with appressed, light golden pubescence; first five abdominal tergites with rather broad, light golden pubescent fasciae apically; abdominal sternites lightly clothed with short, decumbent, silvery pubescence, the apical ones with short, scattered, erect setulae.

Head with pit-like puncturation throughout on face, vertex and temples; clypeus transverse, subtruncate and apically with a broad, very shallow sinus and a narrow transverse, nitidous, concave bevel, the apical margin of which is beaded while the upper margin is distinctly edged and provided with an irregular row of stiff, light aeneous setae; front with the median longitudinal keel low and about half as long as the scapes; temporal carinae absent; occipital carinae present and well developed; no spines or tubercles in the gular region; ocellocular line almost twice the length of the postocellar line; inner margins of the posterior ocelli strongly tuberculate, the tubercles longitudinal, elongate, shining, highly polished and sparsely punctate, laterally overhanging the posterior ocelli, the anterior corners provided with a small dentoid process which projects somewhat over the median ocellus, the tubercles separated from each other by a deep median, longitudinal cleft.

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[80] After the Yavapai Indians of southern Arizona.

Thorax with fine basic acupuncturation upon which is superposed a series of irregular, close, rather deep pits; pronotum with anterior dorsal margin rounded except medially where it is transversely carinate for a short distance, acutely dentate at the lateral corners below which at the level of the neck is a strong sideward projecting spinous tubercle, posterior margin obtusely and broadly angulate cephalad; mesonotum with a thin, median longitudinal line; scutellum very weakly margined laterally, each anterior lateral corner with a very narrow, elongate, transverse, trigonal, non-pubescent fovea; postscutellum simple; mesopleura with fine basic acupuncturation upon which is superposed a series of moderate, rather shallow, close pits filled with rather shaggy, short, appressed silvery pubescence, anteriorly rounded and without an epicnemium; metapleura and lower half of the lateral faces of the propodeum glabrous, shining, highly polished and with a few minute, scattered punctures, the former with several subparallel longitudinal horizontal rugulae dorsally, the latter irregularly, clathrately and finely areolated dorsally. Dorsal face of the propodeum medially with a glabrous, shining, highly polished and impunctate, transverse isoscelar trapezoidal area which has a series of rather regular, subparallel carinulae that radiate somewhat from the posterior margin of the postscutellum and delimit a transverse series of elongate areolets; caudate of this median dorsal area is a broad transverse, irregular subreniform areolet, the posterior margin of which is angularly excised and into which fits the median cuneate areolet of the posterior face, this cuneate areole shining and with fine scattered puncturation to minutely rugulose within; lateral areas of posterior face glabrous, shining, irregularly and obliquely rugulose; dorsal face of propodeum laterad of the median glabrous portion irregularly and clathrately areolate; propodeal spines short, acute, directed sideward. Hind tibiae with the teeth evenly spaced.

Abdomen shining, with sparse basic acupuncturation upon which is superposed a series of scattered pit-like punctures similar to but somewhat finer than those of head; apical margins of second to fifth segments with a strong, regular, pectinate fimbria which is aenous on the tergites and silvery on the sternites, that of the latter broadly interrupted medially. Pygidium elongate trigonal, about three times as long as broad at base, the lateral

margins serrulate, the dorsal surface finely pitted and longitudinally striato-rugulose, the lateral faces longitudinally striato-punctate.

Allotype.—♂ ; topotypic, same data as type; [A. N. S. P.]

Male.—5.5 mm. long. Similar to the female except as follows: posterior face of propodeum lateral of median cuneate area irregularly and clathrately areolated; second to fifth abdominal sternites with long fringes of white hair medio-apically; penult tergite coarsely, longitudinally striato-punctate and with the dorso-lateral margins dentate apically on each side; pygidium subquadrate, striato-punctate like penult tergite, novendentate.

Paratypes.—ARIZONA: 1 ♀ ; Toltec, Pinal County, elevation 1200 feet, August 23, 1937, (Rehn, Pate & Rehn), [A. N. S. P.]. 5 ♂, 9 ♀ ; Tempe, Maricopa County, August 2-4, 1917, (J. Bequaert), [M. C. Z.]. 5 ♀ ; Tempe, August 3, 1917, (J. C. Bradley), [Cornell]. 2 ♀ ; Phoenix, Maricopa County, August 2-7, 1917, (J. C. Bradley), [Cornell].

Variation.—In the series of specimens of this species before me there is a certain amount of variation in size, ranging from 7 mm. in the case of the type to 5.5 mm. in the case of the allotype described above. The specimens from Tempe average 6 to 6.25 mm. long. In addition, the sculpturing of the propodeum is likewise somewhat variable; the transverse series of areoles on the dorsal face immediately caudad of the postscutellum have a tendency for the separating carinulae to become weak, obsolescent, or even quite irregular, while the areas laterad of the median cuneate areolet on the posterior face exhibit a tendency toward becoming irregularly areolated. Aside from these features, however, all the specimens agree with the type and allotype in all essential particulars and I am convinced that but one species is represented in the material I have had before me.

Metanysson (Metanysson) catamarcensis (Schrottky)

Paranysson (Metanysson) catamarcensis Schrottky, Soc. Entom., xxv, p. 70, (1910). [♂.]

Type.—♂ ; Catamarca, Argentina; (C. Bruch).

I am not aware of the location of the type of this species.

Remarks.—I have seen no material of this species, apparently still known only from the unique male described by Schrottky but according to the original description, *catamarcensis* may be distinguished from the other known members of the genus by the characters given in the key to species on a preceding page. Only two other neotropical species of the typical subgenus of *Metanysson* are as yet known, both of them being described from Brazil. The present form may be immediately differentiated from *layano* from the Matto Grosso by the bispinose character of the postscutellum and the tuberculate ocellar area, while from the Amazonian *Alfkeni* it may likewise be distinguished by the structure of the postscutellum and also by the entirely black abdomen and the quinquedentate pygidium of the male.

Metanysson (Metanysson) Alfkeni (Ducke)

Nysson Alfkeni Ducke, Zeitschr. Hymen. & Dipt., IV, p. 190, (1904). [♀; ♂.]

Original Material.—Ducke described this Brazilian species from material taken during October, 1903 at Alcantara in the state of Maranhão, and at Alemquer in Grão Pará in January, 1904. I am not aware of the present location of this type series. In his original description Ducke did not specify which specimen was to be considered the holotype and which the allotype, although I judge that a female is to be regarded as the type and a male the allotype.

Remarks.—I have seen no material of this Amazonian form but according to Ducke's description it may be separated from both the other South American species by the red basal segments of the abdomen and the "briefly bilobate" postscutellum, and in addition, from *layano* by the tuberculate ocellar area. Furthermore, the hind tibiae are said to be provided with only three teeth whereas all the other known forms of *Metanysson* have four.

Metanysson (Metanysson) solani (Cockerell) (Pl. VIII, fig. 19.)

Nysson solani Cockerell, Trans. Amer. Ent. Soc., XXII, p. 294, (1895); [♀; Las Cruces, New Mexico].—Fox, Journ. N. Y. Ent. Soc., IV, p. 13, (1896); [♀].—Cockerell, Proc. Davenport Acad. Nat. Sci., VII, p. 143, (1898); [Mesilla Valley, New Mexico].—Patton, Ohio Nat., IX, p. 442, (1909).—Cresson, Mem. Amer. Ent. Soc., no. 5, p. 48, (1928).

Metanysson solani Ashmead, Canad. Entom., XXXI, pp. 326 & 329, (1899); [♀].—Pate, Mem. Amer. Ent. Soc., no. 9, p. 39, (1937).

Type.— ♀ ; Las Cruces, Dona Ana County, New Mexico, July 13, 1893, (T. D. A. Cockerell; on *Solanum elaeagnifolium*), [Academy of Natural Sciences of Philadelphia. Type no. 10070].

This, the genotype of *Metanysson,* has the superficial habitus of the Californian *coahuila,* agreeing with it in the relatively low and simple tubercles of the ocellar area, the similar transverse concave clypeal bevel, and the general colouration. However, it is readily separable from that species as well as all the other known North American forms by the bispinose character of the postscutellum, apparently conforming in this respect with the Brazilian *Alfkeni* from which it may be distinguished by the features given in the foregoing key to species.

The present species has been known hitherto only from the unique female described by Cockerell but I now have before me specimens that in all probability represent the opposite sex which I describe herewith.

Allotype.— ♂ ; Tempe, Maricopa County, Arizona, July 31, 1917, (J. Bequaert), [Museum of Comparative Zoology].

Male.—6 mm. long. Black; mandibles fulvous, apices red; legs distad of coxae, tegulae, first two abdominal segments russet, remainder of abdomen very dark brown. Wings hyaline slightly tinged with fuscous particularly toward apex; veins dark brown.

Head with the face, vertex and temples clothed with short appressed silvery pubescence, clypeus with longer and more conspicuous appressed silvery pile; dorsal surface of pronotum, mesopleura and lateral areas of dorsal face of propodeum rather heavily clothed with appressed silvery pubescence, remainder of thorax and propodeum save metapleura, lateral faces of propodeum, medial area on the dorsal face and the posterior face of propodeum which are glabrous, more sparsely clothed with appressed silvery pile. Abdomen and legs sparsely clothed with very fine appressed silvery pubescence; first abdominal tergite with a conspicuous silvery pubescent fascia apically.

Head with coarse, close punctures on face, vertex and temples; clypeus flat, truncate apically and provided there with a narrow, transverse, nitidous, concave bevel, the apical margin of which is inconspicuously beaded while the upper margin is distinctly edged and provided with an irregular row of light aeneous setae. Front with the median longitudinal keel low and short, about two-thirds the length of scape; temporal carinae poorly developed; no spines or tubercles in gular region; ocellocular line about twice the length of the postocellar line; inner margins of each posterior ocellus with a simple, low, elongate, polished tubercle; scape obcuneate, short, about one-third the length of eye, pedicel subglobose, flagellum subclavate apically, the last segment simple, not excavate beneath or otherwise modified.

Thorax with coarse, semiconfluent puncturation; pronotum with the anterior dorsal margin rounded, acutely dentate at lateral angles below which at level of neck is a strong sideward projecting spinoid tubercle, posterior margin very broadly and shallowly angulate cephalad; mesonotum with an impressed, inconspicuous, median longitudinal line for its entire length; scutellum very weakly margined laterally, each anterior lateral corner with a very narrow, elongate, transverse, trigonal, non-pubescent fovea; postscutellum with two small tuberculoid spines; mesopleura rounded anteriorly, without an epicnemium; metapleura and lower half of lateral faces of propodeum glabrous, shining, highly polished and impunctate, the former with a few weak horizontal longitudinal carinulae above, the latter irregularly, clathrately and finely areolated dorsally. Dorsal face of propodeum with a median trapeziform area with a number of irregular longitudinal subrectangular areolets; posterior face with the surface finely rugulose, medially with a lyriform areole laterad of which on each side is an irregular pentagonal areolet. Fore wings with the first recurrent vein almost interstitial with the first transverse cubital nervure which is almost straight and scarcely angulate. Hind tibiae with the teeth evenly spaced.

Abdomen shining, with a sparse basic acupuncturation upon which is superposed a series of scattered, moderately heavy punctures; apical margins of second to fifth segments with a strong, regular, pectinate, light aeneous fimbria which is narrowly interrupted medially on the sternites for the medio-apical fringes of long white hair; pygidium subquadrate and novendentate.

Distribution.—With the meagre data at hand it is extremely hazardous to venture any conclusions on the distribution of this species, yet *solani* is apparently confined to the xeric regions of the lower sonoran zone of New Mexico and Arizona.

Specimens examined: 3: 1 female, 2 males.

NEW MEXICO: 1♀, Las Cruces, Dona Ana County, July 13, 1893, (T. D. A. Cockerell; on *Solanum elaeagnifolium*), [*type*, A.N.S.P.].

ARIZONA: 2♂, Temple, Maricopa County, July 31, 1917, (J. Bequaert), [M.C.Z.].

Metanysson (Metanysson) coahuila[81] new species (Pl. VII, fig. 9.)

The closest relative of the present species is the more easternly distributed *solani* which it closely resembles in general habitus, but is separable from that form in the bilobate rather than bispinose character of the postscutellum and the presence of a median longitudinal carinula bisecting the pygidial area. The chief differential features distinguishing *coahuila* from the other forms of the subgenus have been given in the foregoing key to species.

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[81] After the Coahuila Indians who formerly inhabited the region near Riverside, California.

Type.—♀ ; near Palm Springs, Riverside County, California, June 8, 1930, (P. H. Timberlake; on *Eriogonum trichopes*), [Academy of Natural Sciences of Philadelphia, Type no. 4207.].

Female.—7 mm. long. Black; labrum and mandibles fulvous, apices of latter red; scape, pedicel, first three flagellar articles, clypeus, and disc of front in region of frontal keel, tinged with reddish; prothorax and mesopleura ferruginous tinged with black; metapleura, propodeum, legs entirely, first two abdominal tergites and first three sternites entirely, third and fourth tergites laterally and narrow apical margins of fourth and fifth tergites, ferruginous. Wings hyaline slightly infumated anteriorly in marginal cell and toward apex; veins dark brown.

Head, thorax exclusive of metapleura and lateral faces of propodeum and discal area of dorsal face of propodeum clothed with appressed silvery subvillous pubescence. Abdomen generally with an appressed finer puberulent pile particularly noticeable on basal half of first abdominal tergite; first four tergites with very light golden appressed pubescent fasciae apically.

Head with a very fine basic acupuncturation upon which is superposed on front a series of well separated and rather coarse pit-like punctures, vertex and temples with superposed puncturation finer and closer than that of front; face broad, width of front at antennal insertions subequal to length of eyes; clypeus flat, apically with a narrow, transverse, concave, nitidous bevel, the apical margin of which is truncate and indistinctly beaded while the upper edge is distinctly margined and projects over the bevel; front with the median longitudinal keel low and somewhat indistinct, about two-thirds the length of scapes; temporal carinae absent; no spines or tubercles in gular region; ocellocular line not more than one and one-half times the length of the postocellar line; posterior ocelli with their inner margins moderately tuberculate; scape cylindrical, pedicel subglobose, flagellum subclavate.

Thorax with fine basic acupuncturation upon which is superposed a series of larger, coarser, close punctures on pronotum and mesonotum; pronotum with anterior dorsal margin rounded, not transversely carinate, dentate at lateral angles below which at level of neck is a short, acute, sideward projecting, spinoid tubercle, posterior margin arcuate and strongly impressed; mesonotum with a fine inconspicuous median longitudinal line on anterior half; scutellum rugosely punctured, tumid with a shallow median longitudinal sulcus, not margined laterally, each anterior lateral corner with a very narrow elongate, transverse, cuneate, non-pubescent fovea; postscutellum tumid, with a small flat backward projecting lobe-like process on each side of median line; mesopleura with rather large close, pit-like punctures, rounded anteriorly and without an epicnemium, dorsally below tegulae subtuberculate; metapleura and lateral faces of propodeum glabrous, the former nitidous with a few subparallel horizontal rugulae above and below, the dorsal margin with a strong semitranslucent sideward projecting flange; lateral faces of propodeum shining, punctate anteriorly to obliquely striato-punctate posteriorly. Dorsal face of propodeum glabrous and nitidous discally, medially with a trapeziform area bisected by a longitudinal carinula on each side of which are two somewhat oblique subrectangular areoles, laterad of which is an obtrigonal areolet, caudad of the dorsal trapeziform area is a subdorsal transverse subreniform areole divided medially by a continuation of the carinula bisecting the trapeziform dorsal area; posterior face of propodeum glabrous, shining, the surface finely rugulose, discally with a lyriform areolet. Fore wings with the second recurrent vein almost interstitial with the first transverse cubital nervure which is almost straight and scarcely angulate. Hind tibiae with the teeth evenly spaced.

Abdomen shining, with a fine basic acupuncturation upon which is superposed a series of larger, coarser, scattered punctures, the biserial puncturation not as noticeable on first two tergites as on the third to last tergites and all the sternites; tergites constricted apically; second to fifth segments with rather fine, close, light aeneous fimbriae, narrowly interrupted medially on sternites; pygidium elongate trigonal, about thrice as long as broad at base, lateral margins serrulate, the disc biserially punctate and bisected by a low longitudinal carinula; lateral faces of ultimate tergite biserially and strongly striatopunctate.

Male.—Unknown.

This interesting Californian species is known only from the unique female.

HUACHUCA[82] new subgenus

GENOTYPE: *Metanysson (Huachuca) arivaipa* new species.

This group which is clearly a development out of the typical *Metanysson* complex may be readily differentiated from that subgenus by the striking and characteristic venation of the fore wing as given in the key to subgenera on a preceding page.

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[82] The Indian name for a group of mountains in southern Arizona.

Subgeneric Characters.—In addition to the features given under the generic characterization, the second recurrent vein of the fore wing is received by the apparent second submarginal cell (*i.e.* the third submarginal cell morphologically), and the first recurrent vein is received by the apparent first submarginal cell (*i.e.* actually the combined first and second submarginal cells); the apparent first transverse cubital vein straight, not angulate as in *Metanysson* in the restricted sense.

This subgenus has been erected for the reception of the following species which at the present time is the only one which may be assigned to it with any degree of certitude. It is quite possible that some of the South American forms of which I have seen no material and know only from the literature may ultimately prove to belong to this group rather than to the typical subgenus where at present I have placed them.

Metanysson (Huachuca) arivaipa[83] new species
(Pl. VII, figs. 3, 5; Pl. VIII, fig. 18.)

This species bears a superficial resemblance to *M. (Metanysson) yavapai,* particularly in the structure of the ocellar area but in addition to the markedly different venation of the fore wing, may be readily distinguished from that species by its bispinose postscutellum.

Type.—♂; eight miles south of Chandler, Pinal County, Arizona, elevation 1200 feet, August 23, 1937, (Rehn, Pate & Rehn; at flowers of shrubby willow-like tree alongside wash by railroad track), [Academy of Natural Sciences of Philadelphia, Type no. 4182].

Male.—10 mm. long. Black: antennae, legs and abdomen brownish-black; first abdominal tergite with a narrow elongate stripe laterally, second tergite with a small spot laterally, whitish yellow. Wings hyaline, the marginal cell of fore wing slightly infumated anteriorly; veins dark brown.

Head with coarse puncturation which is obscured by the appressed pilosity that is silvery below the antennae and along the inner margins of the compound eyes, and silvery golden above the frontal crest; vertex more sparsely haired, pilosity there erect, surface coarsely reticulate to clathrately punctured; clypeus truncate apically and with a transverse, concave, nitidous bevel, the upper margin of which is distinctly and sharply edged; front with the median longitudinal keel extending dorsad to about the middle of face, at dorsal point of this keel diverge on each side weak margins or edges directed toward the inner margins of the compound eyes, ventrad of this margin the front is strongly concave forming scapal basins; posterior ocelli with the interocellar area strongly raised and overhanging the posterior ocelli laterally, the raised area or tubercles shining, highly polished and almost impunctate behind, medially with a deep longitudinal cleft or trough which broadens out anteriorly into a subcircular basin just behind the median ocellus which is overhung on each side by a projecting dentoid process of the raised inner marginal area of the posterior ocelli; temples narrow, temporal carinae present and well developed, at least on the lower half, although somewhat obscured by the coarse sculpturing of this area, the carinae ending below in the posterior articulation of the mandibles; antennae simple, filiform, the flagellar articles not excavate or otherwise modified.

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[83] After the Arivaipa Indians of Arizona.

Thorax with the pronotum coarsely pitted, rounded anteriorly and laterally, not carinate, spinose nor dentate there, the posterior margin broadly, obtusely angulate, dorsal area just before the posterior margin broadly, transversely and shallowly sulcate, the sulcus thickly clothed with appressed golden pubescence. Mesonotum somewhat more coarsely pitted than the pronotum, thinly clothed with silvery pubescence, some of which is appressed and some erect, medially with an impressed, narrow, impunctate, longitudinal line; scutellum coarsely pitted like mesonotum but more heavily clothed with appressed golden pubescence, the lateral margins not reflexed nor with any kind of rims, medially with a longitudinal groove which is faint anteriorly but rather deeply impressely caudad; postscutellum thickly clothed with appressed golden pubescence, laterally on each side with a short, thick, blunt, obliquely backward projecting spine. Mesopleura coarsely pitted like mesonotum, the pits filled with appressed silvery pubescence, anteriorly without an epicnemium, dorsally just below the tegulae simple, without tubercles or spines. Metapleura and lateral faces of the propodeum glabrous, nitidous; dorsal margin of the metapleura with a conspicuous thin, narrow, projecting flange. Propodeum with the dorsal face laterally on each side clathrately areolate and rather heavily clothed with appressed golden pubescence to the bases of the stout caudolateral spines, the median dorsal area glabrous, nitidous and with four small areoles immediately following the postscutellum, caudad of these is a shining, nitidous, glabrous subobcordate areolet delimited by strong lateral carinae and divided medially by a strong, median longitudinal keel; posterior face of propodeum glabrous and nitidous, dorsally with a median cuneate area, the upper margin of which fits into the posterior median emargination of the dorsal obcordate area, laterad of the median cuneate area on each side is a longitudinal carina subparallel with the lateral margins of the cuneate area. Mesosternum finely pitted at most, and thickly clothed with fine appressed silvery pubescence.

Abdomen with coarse scattered puncturation; first five tergites with a preapical fascia of appressed golden pubescence; second to fifth tergites and sternites inclusive with a coarse spinose golden fimbria apically, that of the

sternites interrupted medially by a fringe of long white hairs; penult tergite with a dorso-lateral spine apically on each side; pygidium septendentate apically, the disc semiconfluently punctured.

Female.—Unknown.

Paratype.—♂; Phoenix, Maricopa County, Arizona, August 2 to 7, 1917, (J. C. Bradley), [Cornell University].

The paratype agrees with the type in all essential particulars except that the sides of the prothorax, the metapleura, the sides and the posterior face of the propodeum, and the first two abdominal sternites are russet in colour, while the legs are light fulvous with the middle femora and the hind tibiae and metatarsi very dark brown.

The type and paratype are the only specimens as yet known of this distinctive and interesting species. The acquisition of additional material, particularly of the female sex, is awaited with much interest.

EXPLANATION OF PLATES

PLATE VII

Fig. 1.—Fore wing of *Foxia navajo* new species.

Fig. 2.—Fore wing of *Metanysson* (*Metanysson*) *yavapai* new species.

Fig. 3.—Fore wing of *Metanysson* (*Huachuca*) *arivaipa* new species.

Fig. 4.—Last three antennal segments of male of *Cresson* (*Cresson*) *parvispinosus* (Reed).

Fig. 5.—Hind femur and tibiae of *Metanysson* (*Huachuca*) *arivaipa* new species.

Fig. 6.—Last three antennal segments of male of *Foxia navajo* new species.

Fig. 7.—Last three antennal segments of male of *Foxia pacifica* Ashmead.

Fig. 8.—Anterior aspect of head of *Cresson* (*Cresson*) *parvispinosus* (Reed).

Fig. 9.—Pygidium of female of *Metanysson* (*Metanysson*) *coahuila* new species.

Fig. 10.—Pygidium of female of *Metanysson* (*Metanysson*) *yavapai* new species.

Fig. 11.—Pygidium of male of *Metanysson* (*Metanysson*) *yavapai* new species.

Fig. 12.—Hind tibiae of *Metanysson* (*Metanysson*) *lipan* new species.

PLATE VIII

Fig. 13.—Pygidium of female of *Foxia pacifica* Ashmead.

Fig. 14.—Pygidium of male of *Foxia pacifica* Ashmead.

Fig. 15.—Pygidium of male of *Foxia secunda* Rohwer.

Fig. 16.—Pygidium of female of *Foxia navajo* new species.

Fig. 17.—Last abdominal tergite of female of *Cresson* (*Perisson*) *basirufus* (Brèthes).

Fig. 18.—Pygidium of male of *Metanysson* (*Huachuca*) *arivaipa* new species.

Fig. 19.—Pygidium of male of *Metanysson* (*Metanysson*) *solani* (Cockerell).

Fig. 20.—Pygidium of male of *Metanysson* (*Metanysson*) *layano* new species.

Fig. 21.—Pygidium of male of *Foxia navajo* new species.

Fig. 22.—Pygidium of male of *Foxia cuna* new species.

Fig. 23.—Pygidium of male of *Nysson* (*Hyponysson*) *raui* Rohwer.

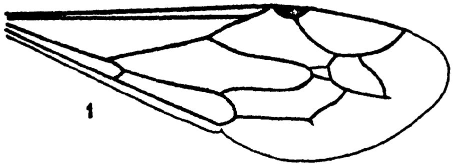
Fig. 24.—Pygidium of male of *Zanysson changuina* new species.

Fig. 25.—Pygidium of male of *Nysson* (*Epinysson*) *sigua* new species.

Fig. 26.—Pygidium of male of *Nysson* (*Epinysson*) *maiae* new species.

Fig. 27.—Last abdominal tergite of male of *Cresson* (*Cresson*) *parvispinosus* (Reed).

Fig. 28.—Last abdominal tergite of female of *Cresson* (*Cresson*) *parvispinosus* (Reed).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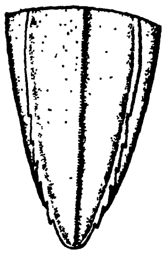
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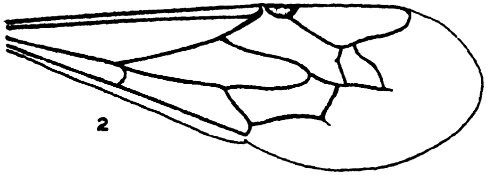
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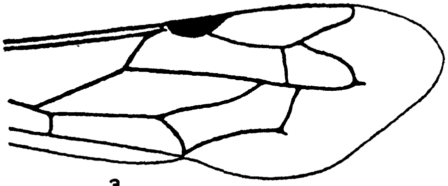
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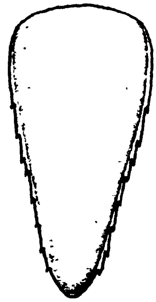
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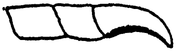
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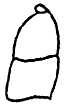
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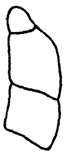
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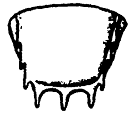
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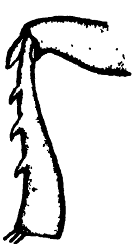
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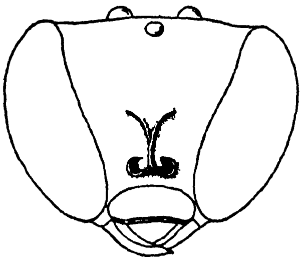
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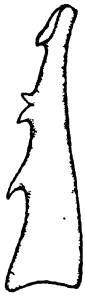
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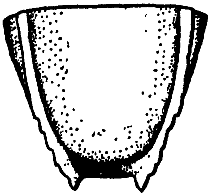
PATE—NYSSONINE WASPS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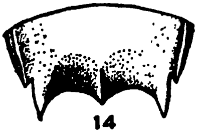
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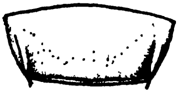
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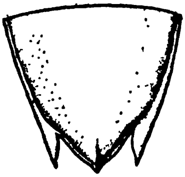
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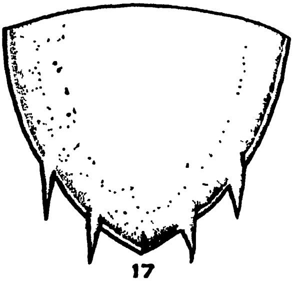
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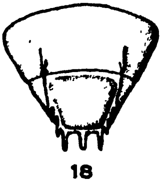
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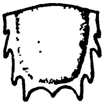
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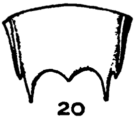
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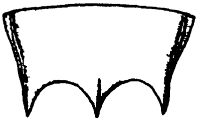
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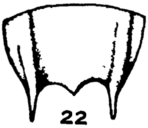
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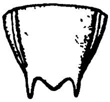
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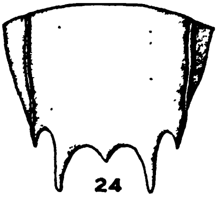
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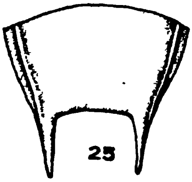
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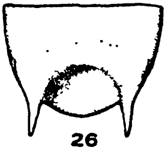
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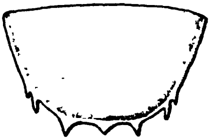
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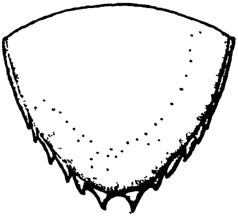
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PATE—NYSSONINE WASPS

A NEW SPECIES AND RECORDS OF PAMPHAGINAE FROM NORTH AFRICA AND SPAIN.

(ORTHOPTERA: ACRIDIDAE)

BY H. RADCLYFFE ROBERTS

Dr. Edwin R. Helwig and the late Dr. Phillip B. A. Powers, both of the University of Pennsylvania Zoology Laboratory, secured an interesting collection of Orthoptera from North Africa and southern Spain during the summer of 1932. The objective of the trip was to obtain gonad material for cytological studies. The specimens from which these gonads were taken have been very kindly deposited in the Orthoptera collections of the Academy of Natural Sciences of Philadelphia. Upon determining the pamphagids it was found that one species of the genus *Acinipe* was new to science and is described below. In addition to this the other records of this subfamily are included.

Euryparyphes bolivarii (Stål)

Algeciras, Spain; VI, 29, 1932; 1 ♂, 1 ♀.

Euryparyphes flexuosus Uvarov

Azrou, Morocco, (in valley south of town); 2000 m.; VII, 11, 1932; 14 ♂, 4 ♀.

This species was described from a pair taken at this locality.

Acinipe hesperica Rambur

Guercif, Morocco, (near border of Algeria); VII, 12, 1932; 1 ♂.

Acinipe expansa (Brunner)

Algeciras, Spain; VI, 29, 1932; 18 ♂, 3 ♀. Tangier, Morocco; VII, 5, 1932; 1 ♂.

Acinipe algerica (Brunner)

Saida, Algeria; VII, 18, 1932; 2 ♂.

Acinipe strigata[1] new species

This genus contains some twenty species and there being no recent comprehensive treatment of the group, it is rather difficult to make out their proper association. In all probability a number of the species will prove to be little more than geographic races or subspecies of each other. This new species is most closely related to *Acinipe expansa* (Brunner) and *Acinipe algerica* (Brunner) in that the ventral margin of the ultimate sternite in lateral aspect extends almost straight to an acute apex and the surface of the pronotum and the abdomen is relatively smooth; where as the association including *A. dolichocera* (Bolivar), *A. inflata* Werner, etc. has the ventral margin of the ultimate sternite in lateral aspect strongly upturned towards its apex to form an approximate right angle with the dorsal margin at the apex; and where as the *A. hesperica* Rambur and *A. crassicornis* (Bolivar) association has the pronotum and the dorsum of the abdomen very roughened or rugose. This new species differs, however, from *A. expansa* and *A. algerica* in lacking any tooth-like projection close to the caudal margin of the abdominal tergites on the mid-dorsal carina.

Type.— ♂ ; Azrou (in valley south of town), Morocco. Elevation 2000 m. July 11, 1932. (E. R. Helwig and P. B. A. Powers). [Academy of Natural Sciences of Philadelphia, Type no. 5568].

Closely similar in size and structural details to *A. expansa.* It differs in that the pronotal crest or carina is lower and less arcuate in lateral aspect; also it is less deeply cut by the transverse sulcus. As mentioned above, the mid-dorsal ridge of the abdomen lacks any sharp tooth-like projection near the caudal margin of several of the anterior abdominal tergites.

Head relatively smooth. Apex of fastigium deeply cleft; lateral carinae diverge straight from apex to near lateral ocelli and from thence extend parallel, caudad, between the eyes. No pronounced median carina on dorsum of head. Frontal costa narrow, strongly sulcate; lateral carinae of same diverge slightly from apex of fastigium ventrad; slightly constricted just below the median ocellus. Lateral facial carinae pronounced and straight. Antennae relatively long cylindrical. Pronotal crest moderately arcuate with slight emargination where it is cut by principal sulcus; not longitudinally sulcate. No defined lateral margins or lateral carinae on disk of pronotum; caudal margin slightly and very broadly obtuse angulate emarginate with median point narrowly rectangulate emarginate. Prosternal spine formed by the strong production ventrad of the median portion of the anterior margin of the prosternite; apex bluntly though narrowly rounded with a slight median impression or emargination suggested.[2] Tegminal pads long narrow and apically rounded extending to caudal margin of first abdominal tergite. Metanotum and anterior three or four abdominal tergites slightly carinate on their dorso-median line, and lack any tooth-like projections. Mid-ventral line of ultimate sternite in lateral aspect extends straight to apex.

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[1] An allusion to the series of small, black stripes on the pronotum.

Paratypes.—In addition to the type we have four males with similar data and also six males from Fedhala near Casa Blanca, Morocco, taken July 8, 1932. All of these are considered paratypes. Unfortunately we have no females.

Coloration.—General tone straw color. Ventral longitudinal stripe on lateral lobes of pronotum chalky white. Posterior and anterior margins of pronotum have a series of black longitudinal stripes extending in from the margins a short distance. Lateral portion of caudal margin of abdominal tergites with three black spots on either side. About seven small black spots on dorsal margin of external pagina of hind femora. Tegminal pads with dorsal half pale straw color; ventral half fuscous brown. Inner and ventral face of hind tibiae on their proximal two thirds bluish black; distal third red. One of the specimens from Azrou lacks much of the distinctive coloration which is so pronounced in the rest of the series from both localities.

Measurements.—Type: length of body (abdomen somewhat upturned caudad) 31; length of antennae 15; length of pronotum 7; length of hind femora 17; length of tegminal pads 6.5 mm. There appears to be little variation in size in the whole series.

Pamphagus elephas (Linnaeus)

Algiers, Algeria; VII, 21, 1932; 26 ♂, 2 ♀. Baba Ali, near Algiers, Algeria; VII, 23, 1932; 1 ♂.

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[2] This is much more pronounced among many of the paratypes so that it there results in two apical processes.

NORTH AMERICAN FUNGUS GNATS. II[1]

(DIPTERA: MYCETOPHILIDAE)

BY ELIZABETH G. FISHER

(Plate IX)

Johannsen records one recent species of the genus *Anatella* Winn., *A. silvestris* Joh. from New York. Since that time Garrett has described *A. difficilis* from British Columbia and I have taken *A. ciliata* Winn. at Meramec State Park, Missouri, May 7, 1936; and at Cockeysville, Maryland, March 26, 1938; *A. incisurata* Edw. at Big Intervale Margaree, Cape Breton Island, Nova Scotia, August 31, 1936; and *A. affinis* n. sp. here described in Maryland in January.

Key to Nearctic Species of the Genus Anatella

1. Sc long; Cu forks near the base of wing .... *difficilis* Garr.
Sc short; Cu forks distad of M fork 2

2. Mesonotum vittate. Superior portion of male styles without a mesal branch .... *silvestris* Joh.
Mesonotum not vittate. Superior portion of male styles with a mesal branch 3

3. Hind femora with a row of fine setae below; middle femora with a double row of strong spines below in addition to a row of fine setae *ciliata* Winn.
Not as above 4

4. C extends less than ½ the distance from tip of R. to tip of M_{1+2}. Color dark. Mesal branch of superior portion of male styles strongly furcate .... *incisurata* Edw.
C extends ½ the distance from tip of R. to tip of M_{1+2}. Color light. Mesal branch of superior portion of male styles short, simple, and capitate .... *affinis* n. sp.

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[1] Part I appeared in *Jour. New York Ent. Soc.*, XLV, pp. 387-398, 1937.

Anatella affinis new species (Pl. IX, figs. 2, 3, 4.)

This species runs to *A. setigera* Edw. in both Edwards,[2] and Landrock's[3] keys. It differs from *A. setigera* in the color of the abdomen, length of the spurs of the middle tibiae, and in hypopygial structure.

Male.—Total length, 2.5 mm.

Head black; antennae black except the second joint of the scape dusky yellow; palpi dusky yellow. Thorax black. Wings hyaline; C extends less than one-half the distance beyond the tip of R_5 towards the tip of M_{1+2}; Sc short, less than half the length of the basal cell R; petiole of M a little longer than r-m; Cu forks slightly distad of the M fork. Halteres yellow. Legs yellow, darker distally, tips of hind femora dusky, proximal portions of all femora with diffuse dusky spots below; outer spur of middle tibia about three-fourths the length of the inner; hind femora not ciliate below. Abdomen black except lateral yellow triangles on the first to third tergites. Hypopygium as in figures 2, 3 and 4.

Type.—♂; Lock Raven, Towson, Maryland. January 1, 1938. (E. G. Fisher). [Academy of Natural Sciences of Philadelphia, Type no. 6543].

Symmerus diluta new species (Pl. IX, fig. 1.)

This species runs to *S. annulata* Mg and *S. lauta* Lw. in Johannsen's[4] key but differs from both in thoracic and abdominal color. In *S. annulata* the femora are ciliate below; in *S. lauta* the petiole of M and M_{1+2} are subequal; in *S. coqula* Garr. the thorax is black.

Male.—Total length, 5.5 mm.

Head yellow, face dusky, each ocellus surrounded by a circle of black; antennae yellow; palpi yellow, dusky apically; face with strong black setae. Thorax yellow; mesonotum with wide lateral brown stripes, abbreviated anteriorly and two median narrower brown stripes; scutellum brown; postnotum and pleura brown. Anterior and posterior divisions of pronotum and the propleura setose; a group of setae caudad of the anterior thoracic spiracles, these extending over to the dorsal edge of the anepisternites; postnotum with a few inconspicuous setae. Wings hyaline; membrane densely clothed with macrotrichia; R_4 longer than half R_5, originating distad of the M fork; stalk of M shorter than M_{1+2}; M fork and stem

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[2] Edwards, F. W., *Trans. Ent. Soc. London*, 1924, p. 588, 1925.

[3] Landrock, K. *in* Lindner's *Die Fleigen des Palaearktischen region*, 12, (8), p. 93, 1926.

[4] Johannsen, O. A., *Maine Agr. Exp. Sta. Bull.*, 172, p. 228, 1909.

very faint. Halteres yellow, knob slightly dusky. Legs yellow, hind coxae with a row of long setae on their caudal aspects; middle and hind tibiae with several stouter setae among the irregular leg setulae. Abdominal tergites brown with posterior and wide lateral margins yellow; the sixth and seventh segments almost entirely brown. Hypopygium yellow, as in figure 1.

Type.— ♂ ; Fairmont, West Virginia. June 22, 1908. (E. T. Cresson Jr.). [Academy of Natural Sciences of Philadelphia, Type no. 6544].

Ceroplatus fenestralis new species (Pl. IX, fig. 8.)

This species is distinguishable from all other Nearctic species of this genus by its larger size, its color, the fore basitarsus being 1.83 times as long as its tibia, and the spatulate style. This species would fit into the subgenus *Euceroplatus* Edw.

Male.—Total length, 10 mm.

Head black, face yellow with short black setae below, ocelli three in a straight line; scape of antennae yellow, flagellum greatly flattened, with fourteen joints, black; palpi yellow, porrect, of a single segment. Thorax black, pleura slightly lighter; mesonotum black with humeral angles widely yellow and a narrow yellow triangle anterior to the scutellum; postnotum brown laterally. Pleura bare except a fine group of short black setae on the anepisternites; setae of mesonotal disk short and not arranged in definite rows; scutellum with fine short black setae; postnotum bare. Coxae yellow, hind coxae infuscated at their bases; fore and middle tibiae with their setulae regularly arranged, hind tibae with their setulae irregularly arranged except on their distal third; spur of hind and middle tibiae unequal, the outer being less than half the inner in length, the single spur of the fore tibiae equal to the inner spurs of the other tibiae; fore basitarsus longer than its tibia; tarsal claws pectinate. Wings with a diffuse apical fascia and a darker spot over cell R_4 which extends caudad across the base of vein R_5 joining the apical facia and leaving a hyaline spot below the distal end of vein R_5; microtrichia of wing membrane irregularly arranged; Sc ends in C distad of the origin of R_s; C extends ⅓ the distance beyond the tip of R_5 towards the tip of M_{1+2}; basal section of R_s weak; R_4 ends in C closer to the tip of R_1 than its own length. Stalk of M and fused portion of M and R_s subequal; anal fold thickened, vein-like; anals strong. Abdomen black with faint lateral yellow spots on bases of fourth and fifth tergites. Hypopygium figure 8.

Type.— ♂ ; Isle Royale, Michigan. August 3-7, 1936. (C. W. Sabrosky). [Academy of Natural Sciences of Philadelphia. Type no. 6547].

Mycomyia nigra new species (Pl. IX, figs. 6, 7.)

This species runs to *M. dichaeta* Fisher in my key.[5] It differs in color, in the length of the M petiole, in the presence of teeth on the mesocoxal spurs, and in hypopygial structure.

Male.—Total length, 5 mm.
Head black; antennae black, scape dusky yellow. Thorax black; prothorax and hypopleurites dark brown; coxae yellow, the hind coxae and the trochanters infuscated. Prothorax with four or five strong setae; scutellum with two strong marginal setae. Mesocoxal spurs long, tapering with two terminal teeth. Hind coxae with a longitudinal row of fine strong black setae. Wings hyaline; Sc ends in R_1 over the center of cell R_1; stalk of M shorter than M_3; Cu forks under the proximal end of R_s. Halteres yellow. Abdomen black, hind margins of the tergites narrowly yellow; hypopygium as in figures 6 and 7.

Type.—♂; Lock Raven, Towson, Maryland. January 1, 1938. (E. G. Fisher). [Academy of Natural Sciences of Philadelphia. Type No. 6545].

Three females taken at the same time and place agree with the male except the coxae are somewhat darker in two individuals.

Cordyla gracilis new species (Pl. IX, fig. 5.)

This species runs to *C scita* Joh. in Johannsen's key.[6] It differs in the position of the Cu fork and in hypopygial structure.

Male.—Total length, 2.6 mm.
Head black; antennae dusky, scape yellow; enlarged second palpal joint black. Flagellum with thirteen joints. Thorax brown; mesonotum dusky above; scutellum deep brown; pteropleurites with a deep black streak on their cephalic edges. Anepisternites with a line of four strong setae and several smaller setae; pleurotergites with a median line of four or five strong black setae and a dorsal group of more delicate yellow setae; hypopleurites with a group of short, strong setae; scutellum with two strong marginal setae; posterior coxae with four strong basal setae. Legs yellow. Wings hyaline; Cu forks just proximad of the M fork and distad of the middle of the petiole of M. Abdominal tergites brown with narrow posterior margins yellow, the fourth to sixth tergites black. Hypopygium as in figure 5.

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[5] Fisher, E. G., *Journ. New York Ent. Soc.*, XLV, pp. 391-392, 1937.

[6] Johannsen, O. A., *Maine Agr. Exp. Sta. Bull.*, 196, p. 306, 1911.

Type.—♂; Berkely Hills, Alameda Co., California. May 9, 1908. (E. T. Cresson Jr.) [Academy of Natural Sciences of Philadelphia, Type No. 6546]. *Paratype.*—♂; Same data.

Mycetophila pacifica new species (Pl. IX, fig. 9.)

This species runs to *M. jugata* Joh. in Johannsen's[7] key. It differs slightly in wing coloration, in relative lengths of fore tibia and fore basitarsus, and greatly in hypopygial structure.

Male.—Total length, 3.3 mm.

Head dark brown; antennae brown, scape and basal flagellar joint lighter; mouth parts brown. Thorax brown; mesonotum yellow with wide brown lateral stripes abbreviated anteriorly and a medium stripe widened anteriorly; scutellum with a yellow spot at its apex. Propleura with two or three strong setae; anepisternites with six strong marginal and two strong submarginal satae and several smaller setae; pteroplerites with four strong setae; scutellum with four strong marginal setae; pleurotergites and hypopleurites setose. Legs yellow; proximal portions of coxae brownish; hind and middle femora with black tips and brown spots on the proximal portions below. Fore tibia subequal to fore basitarsus; middle tibia with one short and one long seta on the flexor surface, six on the extensor surface; hind tibia with two ranges of setae on the extensor surface. Wings with a dark central spot covering the base of R_s, r-m, and the petiole of M; a preapical spot extending from the tip of R_1 to Cu_1 becoming fainter posteriorly, filling the apex of cell R_1. Halteres yellow. Abdomen black with narrow yellow posterior margins and yellow pile. Hypopygium as in figure 9.

Type.—♂; Terrace, British Columbia. April 1-7, 1933. (Mrs. M. E. Hippisley). [Academy of Natural Sciences of Philadelphia, Type No. 6548].

Sciara bispina new species (Pl. IX, figs. 10, 11.)

This species runs near *S. fumida* Joh. in Petty's key[8] but has two subapical setae on the clasper rather than the two short stout apical spines and the color is darker. This species belongs to group II of Edwards (=*Neosciara* Petty).

Male.—Total length, 2.2 mm.

Head black, somewhat shining; antennae fuscous; palpi fuscous. Thorax somewhat shining, almost black. Legs yellow, tarsi somewhat fuscous distally; fore tibia 1.7 times as long as the fore basitarsus. Wings hyaline; 0.6 mm. wide, 2.0 mm. long; C extends ⅔ of distance from R_3 to M_{1+2}; base of R_s distad of the mid-point between the humeral cross-vein and the tip of R_1; R_1 ends ⅛ of the wing length proximad of the forking of M; R_s ends at .93 the length of the wing about over the tip of M_3; the distance from tip of R_1 to the point on the costa opposite the forking of M greater than the distance from M_{1+2} to M_3; petiole of Cu over half as long as the basal section of M. Halteres yellow, knob dusky. Abdomen black, tergites with slightly lighter posterior margins. Hypopygium fuscous, with no cluster of setae on the mid-ventral line of the zygosternum, claspers with a thick distal and mesal group of hairs, these areas separated on the mesal aspect by a bare luteous area with two prominent setae.

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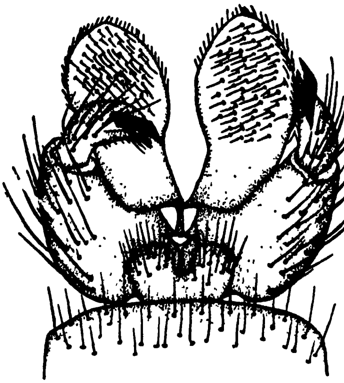
[7] Johannsen, O. A., *Maine Agr. Exp. Sta. Bull.*, 200, pp. 84-88, 1912.

[8] Pettey, F. W., *Ann. Ent. Soc. Amer.*, XI, pp. 320-327, 1918.

Type.—♂; East Lansing, Michigan, June 12, 1936. (C. W. Sabrosky). [Academy of Natural Sciences of Philadelphia, Type No. 6549].

EXPLANATION OF PLATE IX

Fig. 1.—*Symmerus diluta.* Dorsal aspect of hypopygium.
Fig. 2.—*Anatella affinis.* Ventral aspect of hypopygium.
Fig. 3.—*Anatella affinis.* Mesal aspect of style.
Fig. 4.—*Anatella affinis.* Dorsal aspect of style.
Fig. 5.—*Cordyla gracilis.* Lateral aspect of hypopygium.
Fig. 6.—*Mycomyia nigra.* Ventral aspect of hypopygium.
Fig. 7.—*Mycomyia nigra.* Dorsal aspect of hypopygium.
Fig. 8.—*Ceroplatus fenestralis.* Dorsal aspect of hypopygium half.
Fig. 9.—*Mycetophila pacifica.* Dorso-lateral aspect of hypopygium.
Fig. 10.—*Sciara bispina.* Ventral aspect of clasper.
Fig. 11.—*Sciara bispina.* Dorso-mesal aspect of clasper.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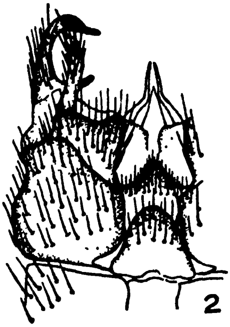
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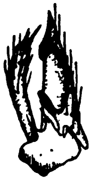
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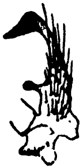
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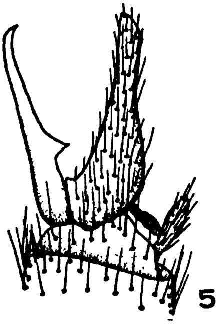
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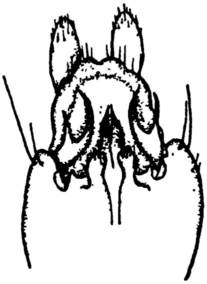
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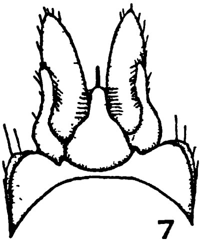
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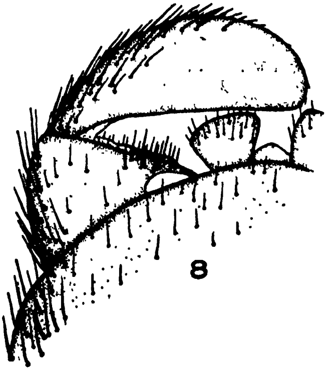
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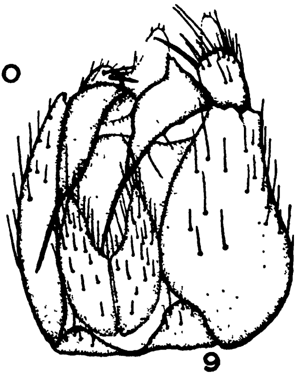
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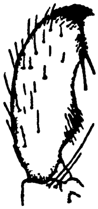
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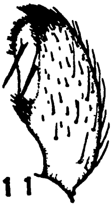
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FISHER—AMERICAN MYCETOPHILIDAE

NEW GENERA AND SPECIES OF WEST INDIAN ACRIDIDAE, WITH NOTES ON PREVIOUSLY-KNOWN SPECIES

(ORTHOPTERA)

BY JAMES A. G. REHN AND MORGAN HEBARD

(Plate X, and text-figures)

The explanation which has already been given in a paper of similar type on West Indian Mantidae and Phasmidae,[1] applies equally well to the present paper. The descriptions represent work completed some years ago, and make available to students conclusions needing no further amplification at this time. The study of far more ample material, which has been assembled in recent years, will make possible the preparation in the not distant future of a reasonably comprehensive study of the West Indian members of the family. In the meantime the descriptions here given will be of service to other workers.

Two new genera and six new species are here described, the synonymy of two species is established, and one poorly understood older species is redescribed. In addition several partial keys have been presented to aid in understanding certain genera discussed.

The abbreviations given through this paper for the names of institutions or collections owning the material here reported, are those generally used by us and their application is evident without special explanation.

ACRIDINAE

Group *Amblytropidiae*

CARIBACRIS[2] new genus

This genus is erected to include the species described by Caudell as *Amblytropidia stoneri*[3] from the island of Antigua.

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[1] Trans. Amer. Entom. Soc., LXIV, p. 33, (1938).

[2] From the Carib people of the Antilles and northern South America.

[3] Univ. of Iowa Studies in Nat. Hist., x, p. 32, (1922). [♂, ♀, juv.; Antigua.]

It is related to the continental genus *Amblytropidia* Stål, although its form is distinctly more typically truxaline, and may be distinguished from the latter by the following key characters:

Fastigium produced, decidedly longer than width between dorsal apices of eyes, apex bluntly rounded. Face with cephalic outline in profile straight and strongly oblique: frontal costa with surface decidedly impressed between its lateral carinae to a point dorsad of the antennae, the impression terminating suddenly near the fastigio-facial angle; lateral carinae of costa convex between the antennal bases, width greatest there. Head and pronotum elongate; lateral lobes of latter with their dorsal length distinctly greater than their depth. Tegmina and wings greatly reduced.
Caribacris new genus

Fastigium short, shorter than to subequal to width between dorsal apices of eyes, apex very bluntly rounded. Face with cephalic outline in profile weakly convex and not as oblique: frontal costa always less strongly impressed between its lateral carinae to a point between the antennae, where the impression disappears but not as abruptly as in alternative; lateral carinae of costa not expanded between antennal bases. Head and pronotum proportionately shorter; lateral lobes of latter with their dorsal length less than their depth. Tegmina and wings full developed.
Amblytropidia Stål[4]

Caribacris stoneri (Caudell)

1922. *Amblytropidia stoneri* Caudell, Univ. Iowa Studies in Nat. Hist., x, p. 32. [♂, ♀, juv.; Antigua.]

ANTIGUA: St. John; VI, 5, 1911; (F. E. Lutz; grassy edge of fields); 3 ♂, 1 ♀; [A.M.N.H.].

The female is cinnamon-brown, obscurely marked with prout's brown. This shows that two color phases occur in that sex, the allotype having the sides largely light green.

Group *Orphulellae*

PARACHLOEBATA Bruner

1904. *Parachloebata* Bruner, Biol. Cent.-Amer., Orth., II, p. 83.

This genus is practically intermediate between *Orphulella* Giglio-Tos and *Dichromorpha* Morse, being closely allied to both. In one feature of the female sex only, it shows a tendency toward *Amblytropidia* Stål.

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[4] Features drawn from material of the genotypic species, *A. ferruginosa* Stål, and numerous others of the genus in the Philadelphia collections.

The following key presents the features of greatest value in separating these three orphulelline genera.

1. Pronotum moderately elongate, lateral lobes in consequence slightly deeper than their dorsal length; dorsal surface with carinae weaker, the lateral carinae usually weaker in some places than in others and showing angulation on prozona, divergent on metazona; surface of disk weakly convex between carinae. Fastigium with impression broad and moderately distinct toward cephalic margin; frontal costa narrowest at fastigio-facial angle (not widened between antennae); lateral foveolae feebly indicated. (Metazona of pronotum usually with dark marking on each side.) ....*Orphulella* Giglio-Tos
   (Genotype—*O. punctata* (DeGeer). Selected by Rehn, 1904.)

   Pronotum elongate, lateral lobes in consequence not as deep as their dorsal length (this less pronounced in *Parachloebata* than in *Dichromorpha*); dorsal surface with carinae heavier and of equal strength throughout their length, showing no angulation on prozona. Frontal costa broader at fastigio-facial angle; lateral foveolae obsolete......2
2. Lateral carinae of pronotum very weakly arcuate so that slight divergence caudad is apparent; surface of disk with faint convexity between carinae. Fastigium with surface impression narrow and weak toward cephalic margin, often very weak in females, frequently with a trace of a very fine medio-longitudinal carina cephalad;[5] frontal costa with a slight broadening between antennae, thus emphasizing a weak narrowing ventrad of this point. Metazona of pronotum with a dark marking on each side ....*Parachloebata* Bruner
   (Genotype—*P. pratensis* Bruner = *Orphula scudderi* Bolivar.)

   Lateral carinae of pronotum parallel or showing only exceedingly feeble divergence caudad; surface of disk deplanate between the carinae. Fastigium with surface impression toward cephalic margin broad and distinct, without trace of a medio-longitudinal carina; frontal costa showing no widening between antennae. Metazona of pronotum immaculate. ....*Dichromorpha* Morse
   (Genotype—*D. viridis* (Scudder).)

Parachloebata scudderi (Bolívar)

1888. *O[rphula] scudderi* Bolívar, Mém. Soc. Zool. France, I, p. 142. [♂, ♀; Cuba.]

1904. *Parachloebata pratensis* Bruner, Biol. Cent.-Amer., Orth., II, p. 84, pl. 1, figs. 10 and 10a. [♀; Cuba.]

Comparison of these descriptions with the series at hand furnishes convincing proof of the synonymy indicated.

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[5] In this respect showing a tendency toward the genus *Amblytropidia* Stål.

CUBA: Guané, Pinar del Rio Prov.; IX, 24-26, 1913; (F. E. Lutz; grassy pasture); 1 ♀; [A.M.N.H.]. Seven kilometers west of Vinales, Pinar del Rio Prov.; IX, 16-22, 1913; (F. E. Lutz; pasture land); 2 ♂, 1 juv.; [A.M.N.H.]. Cerro Cabras, Pinar del Rio Prov.; IX, 11, 1913; (F. E. Lutz; weedy door-yard); 1 ♂; [A.M.N.H.]. Pinar del Rio, Pinar del Rio Prov.; IX, 10, 1913; (F. E. Lutz; in grasses); 1 ♂, [A.M.N.H.]. Five kilometers south of Pinar del Rio, Pinar del Rio Prov.; IX, 14, 1913; (C. W. Leng; meadow beside river); 1 ♀; [A.M.N.H.]. Ten to twelve and one-half kilometers south of Pinar del Rio, Pinar del Rio Prov.; IX, 13, 1913; (F. E. Lutz; among sedges, ferns and grasses beside pond); 2 ♂; [A.M.N.H.]. Cabanas, Pinar del Rio Prov.; IX, 7-8, 1913; (F. E. Lutz; on weedy xerophytic hill and unused pasture); 2 ♂, 1 juv.; [A.M.N.H.]. Zaza del Medio, Santa Clara Prov.; IX, 30, 1913; (F. E. Lutz; weeds along railroad); 1 ♂; [A.M.N.H.]. Cayamas, Oriente Prov.; V. 26-27; (E. A. Schwartz); 1 ♂, 2 ♀; [U.S.N.M.]. Santiago, Oriente Prov.; VIII, 21, 1920; (M. Hebard; occasional in short grass along road in low hills and also in more lush meadow grasses); 2 ♂, 1 ♀, 3 juvs.; [Hebard Cln.]: 1 ♂; [A.N.S.P.]. Guantánamo, Oriente Prov.; IV, 20, V, 18 and X, 23, 1913 and 1914; (C. T. Ramsden); 1 ♂, 2 ♀; [A.N.S.P.]. Baracoa, Oriente Prov.; X, 4, 1901; (A. Busck); 2 ♂, 2 ♀, [U.S.N.M.].

HISPANIOLA: Charpentier, near Aux Cayes, Haiti; III, 19, 1922; (F. E. Watson); 1 ♀; [A.M.N.H.].

All of the females here recorded have a decided longitudinal stripe on the tegmina which is usually green but sometimes yellowish buff. The females develop a green as well as a brown phase; a very few males are entirely brown, the others brown with pale faces and the dorsum and femora green. All of the males have the dorsum of the pronotum, lateral lobes and discoidal and marginal areas of the tegmina very dark brown, the lateral lobes sometimes becoming somewhat paler ventrad.

The species is known from Cuba, over which it is apparently widely distributed, the Isle of Pines and western Hispaniola.

Orphulella decisa (Walker) (Pl. X, fig. I.)

1870. *Stenobothrus decorus* Walker, Catal. Dermapt. Salt. Brit. Mus., IV, p. 757. [♂; "San Domingo".]

HISPANIOLA: Moca, Dominican Republic; I, 1922; (E. Kaempfer); 1 ♀; [A.N.S.P.]. Port-au-Prince, Haiti; III, 21-29, 1922; (F. E. Watson); 1 ♀; [A.M.N.H.].

The original description of this species is exceedingly unsatisfactory, and we are here diagnosing at length the previously unreported female. From information supplied from Walker's type, through the kindness of Dr. B. P. Uvarov, of the British Museum of Natural History, we have been able to establish the identity of Walker's species.

The species is clearly more nearly related to the Cuban *O. brachyptera,* described on a subsequent page, to any other, and under that species we have given the more salient differential features. The figures here presented of the two species should also prove of value to future students.

Both *decisa* and *brachyptera* are depauperate types, agreeing in many respects with the widely distributed Neotropical *C. punctata* (DeGeer), which, however, is a fully alate type.

The more important features of the Moca female, which is here considered as the allotype of *decisa,* are as follows:

Size exceedingly small for the genus; form moderately slender, as average in *Orphulella.*

Fastigium short, about as broad as long, its surface feebly impressed to opposite dorsal points of eyes, its apex subrectangulate, much as in the genotypic species *O. punctata*: frontal costa normal for genus, its broad but distinct sulcation extending to a point dorsad of the antennal bases: lateral foveolae very feebly indicated, as in *O. punctata.* Antennae short, showing distinct flattening proximad but less decidedly so than in *O. punctata.*

Pronotum with transverse sulci decided; median carina distinct, bisected by principal sulcus; lateral carinae more decided than median, moderately convex convergent caudad on cephalic portion of prozona, then very weak and interrupted mesad, where they are most approximate, on metazona nearly as distinct as cephalad and convex divergent caudad; caudal margin of disk weakly produced, in general very broadly obtuse-angulate, the immediate apex rather broadly but shallowly emarginate: lateral lobes of pronotum and genae of head with bluntly raised points, which do not resemble the lateral carinae of the disk.

Tegmina oval lateral pads, with apices moderately truncate, separated mesad by a brief interspace; venation distinct, definition in surface planes in the region of the anal vein distinctly indicated.

Ovipositor valves small, of type usual in genus.

Limbs as usual in genus; caudal tibiae with nine to ten dorso-external spines.

General coloration of Moca female slightly mottled dark mummy brown, paler and speckled with black on face and ventral portion of external paginae of caudal femora, these markings larger on the ventral margin of the latter areas. Dorsum of head and pronotum and the tegmina darker, blackish. Antennae similar to face. Ventral surface and normally concealed surfaces of caudal femora prout's brown. The Port-au-Prince female is decidedly paler than the Moca female, being sayal brown (Ridgway) in general coloration, the lateral lobes of the pronotum dorsad narrowly warm sepia, the marginal and discoidal fields of the tegmina bister.

Measurements (in millimeters)

	Length of body	Length of pronotum	Greatest (caudal) width of pronotal disk	Length of tegmen	Greatest width of tegmen	Interval between tegmina	Length of caudal femur
♂, "San Domingo" type[6]	12.5	3.5	—	4	—	—	9
♀, Moca, Dominican Republic, *allotype*	15.7	3	2.1	2.9	1.8	.4	8.6
♀, Port-au-Prince, Haiti	17.6	3.3	2.3	4.4	—	—[7]	10.8

From these figures it will be seen that the Port-au-Prince female has the tegmina but slightly more reduced than in the Cuban *O. brachyptera,* here described. However, it fully agrees with the Moca specimen in all the diagnostic features of this species as contrasted with *brachyptera.*

Orphulella brachyptera new species (Pl. X, fig. 2.)

This species and the preceding one *(O. decisa)* are distinctive in having greatly reduced organs of flight, all the other numerous known species of the genus being macropterous. In addition the present species is of a distinctly heavier build than the other forms, but a careful analysis shows nothing to warrant even subgeneric separation. Comparison with *O. decisa* shows the present species differs from the latter in the more robust form, broader fastigium, virtually obsolete lateral foveolae, slightly less flattened antennae, less decidedly clepsydral lateral carinae of pronotum, entire apex of caudal margin of pronotal disk, and less extreme tegminal reduction.

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[6] These measurements of Walker's type have most kindly been supplied by our colleague Dr. B. P. Uvarov.

[7] In this specimen the tegmina slightly overlap.

Type.— ♂ : Twelve and one-half kilometers south of Pinar del Rio, Pinar del Rio Province, Cuba. September 12-23, 1913. (F. E. Lutz; in sandy pine-woods much resembling those of Florida.) [American Museum of Natural History.]

Size very small; form robust for the genus.

Fastigium very short, broader than long, margins moderately carinate, surface impressed to opposite dorsal apices of eyes, apex rectangulate: frontal costa very narrow, its greatest width equal to one-fourth of dorsal interocular space, becoming extremely narrow dorsad toward the fastigio-facial angle, below this its surface is weakly sulcate; lateral foveolae practically obsolete. Eyes broad for genus. Antennae short, showing very slight flattening.

Pronotum relatively short; transverse sulci decided; median carina distinct, cut by principal sulcus; lateral carinae more strongly marked than median, weakly convex convergent caudad in cephalic portion of prozona, slightly more approximate, parallel but subobsolete caudad on prozona, decided and weakly convex divergent caudad on metazona; caudal margin of pronotal disk moderately produced, broadly obtuse-angulate with apex rounded: lateral lobes with a few raised points in places, resembling in character the lateral carinae of the disk.

Tegmina elongate oval, overlapping pads, somewhat longer than pronotum, leaving the greater portion of the abdominal dorsum exposed, tapering to their sharply rounded apices; venation distinct. Wings rudimentary, nearly as long as the tegmina.

Abdomen with large, broad and rounded furcula present: ultimate tergite (supra-anal plate) simple, scutellate, distal margin broadly rounded obtuse-angulate; cerci simple, styliform; ultimate sternite (subgenital plate) well rounded conical, apex dorso-distal in position.

Limbs normal; caudal tibiae with ten dorso-external spines.

Allotype.— ♀ ; same data as type. [American Museum of Natural History.]

Differing from the above description of the male in the following noteworthy respects:

Size decidedly larger; form markedly more robust.

Fastigium broader, impression of dorsal surface more distinctly bounded caudad by a concave line, apex forming an angle of approximately more than 90°.

Pronotum broader; raised points on lateral lobes more conspicuous and indicated also caudad on the genae of the head.

Ovipositor valves short and stout, their apices well curved.

Coloration.—General coloration brown, mottled with a darker shade, the caudal femora with three broad bars of darker vaguely indicated to different degree. Males with face paler, approaching buffy brown. One male has the dorsal surface green, another is of the same but has the femora disto-dorsad also tinged with this color. Two females are almost solidly green. In these specimens the lateral carinae of the pronotum, the juncture of the anal and discoidal fields of the tegmina and the limbs are brown, flecked with a darker brown. This latter condition is particularly heavy on the tegmina where noted, the males in the green phase, cited above, having the tegmina similarly colored.

Measurements.—The measure of the type is given first for the males, that of the allotype first for the females. Length of body, ♂, 11 to 12.6 mm.; ♀, 16.6 to 16.8: length of pronotum, ♂, 2.2 to 2.7 ; ♀, 3.4 to 3.7: greatest (caudal) width of pronotal dorsum, ♂, 1.7 to 1.9; ♀, 2.2 to 2.3: length of tegmen, ♂, 3.7 to 3.7; ♀, 5.2 to 5: length of caudal femur, ♂, 7.5 to 7.5; ♀, 10 to 10.1.

In addition to the type and allotype we have examined two paratypic males bearing the same data as the type; one paratypic female taken ten kilometers south of Pinar del Rio, Pinar del Rio Province, Cuba (September 13, 1913; Lutz; from grasses and sedges on side of pond), while two males and three female paratypes and three immature individuals were also secured thirteen kilometers south of Pinar del Rio, Pinar del Rio Province, Cuba (September 14, 1913; Lutz; grass in dry sandy pine woods). All of these specimens were from the collection of the American Museum of Natural History.

Group *Compsacres*

COMPSACRELLA new genus

This genus is closely related to the South American genus *Compsacris* Bolívar,[8] agreeing in the slender and generally similar form, type of fastigium, decided lateral facial carinae, filiform antennae, subcylindrical pronotum with feebly percurrent median carina, simple genitalia, ten or eleven dorso-external spines on the caudal femora and in the internal caudal tibial spurs being longer than the external.

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[8] Anales Soc. Españ. Hist. Nat., XIX. p. 314, (1890). Genotype (by monotypy): *C. pulcher* Bolívar, from Villa Bella, Peru.

From *Compsacris* the present genus differs in the following features, which are important in locating the genus.

Size very small. Vertex with lateral foveolae indicated by roughly quadrate, minute dorso-lateral impressed areas. Antennae much shorter than caudal femora. Caudal margin of pronotum transverse or feebly emarginate in female.[9] Discoidal field of tegmina of male transparent, veins forming a series of large rectangulate areolets.[10] Genitalia simple, of normal type. Caudal femora elongate, but definitely shorter than in *Compsacris;* internal spurs of caudal tibiae very elongate, longer than in *Compsacris,* the ventral one decidedly the longer, fully twice the length of either external spur.

The genotypic and single known species, *C. poecila,* here described, is one of the smallest and handsomest of tropical American grasshoppers.

Compsacrella poecila new species (Pl. X, figs. 3 and 4.)

The comparative features given above under the genus will serve diagnostically to locate this insect.

Type.— ♂ ; Twelve and one-half kilometers south of Pinar del Rio, Pinar del Rio Province, Cuba. September 13, 1913. (F. E. Lutz; in sandy pine woods much like those of Florida.) [American Museum of Natural History.]

In addition to the characters already given, the following appear to have specific value.

Size very small; form slender, as is characteristic of allied genera.

Head with dorsal surface very smooth, very feebly ascending to apex of fastigium, almost horizontal; lateral margins of fastigium as seen from dorsum, forming a right angle with apex broadly and very bluntly rounded, the fastigium as a whole slightly broader than long, surface impressed to the bluntly carinate margins; lateral foveolae prominent, and visible from dorsum: face strongly retreating; frontal costa moderately broad, strongly sulcate to lateral ocelli, so that from the line of the latter ventrad to the clypeus the lateral borders of the costa are conspicuously carinate and largely parallel, becoming moderately divergent ventrad; supplementary facial carinae as conspicuous as carinate margins of frontal costa. Eyes prominent, over four times as long as the decided infra-ocular sulcus. Antennae flattened cylindrical, in length much less than twice that of head and pronotum combined.

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[9] This feature is possibly correlated with the great reduction of the organs of flight in that sex. In the single known species of *Compsacrella* these are much reduced in the male, greatly reduced in the female. In the genotype of *Compsacris,* i.e. *C. pulcher,* the organs of flight are fully developed; in *C. aspasma* Hebard, they show very decided reduction. Material of both of these species of *Compsacris* is in the Philadelphia collections.

[10] In *Compsacris* this field is opaque with veins much more numerous and irregular.

Pronotum very short, shorter than dorsal length of head, evenly convex dorsad; median carina very weak, percurrent; lateral carinae obsolete; prozona almost smooth, surface of metazona shallowly cribroso-punctulate: lateral lobes of pronotum slightly longer than deep, ventro-caudal angle obtuse-angulate. Interspace between mesosternal lobes quadrate.

Tegmina reduced, reaching nearly to apex of abdomen. Wings vestigial, very small, almost linear, greatly atrophied.

Ultimate tergite (supra-anal plate) very simple, elongate trigonal with apex rounded, surface showing a broad and feeble medio-longitudinal sulcus. Cerci simple, styliform. Ultimate sternite (subgenital plate) conical, with apex rather strongly rounded.

Ventral surfaces of tibiae and tarsi appreciably supplied with very fine and long hairs. Caudal femora moderately elongate and distinctly expanded proximad; genicular lobes acute, the external bluntly rounded at apex, internal sharp.

Allotype.—♀; same data as type. [American Museum of Natural History.]

Differing from the male sex in the following noteworthy features.

Size larger; form slightly more robust.

Head with sulci and carinae very slightly less prominent. Eyes less than four times as long as the infra-ocular sulcus.

Pronotum with median carina almost obsolete except on metazona.

Tegmina reduced to evenly oval lateral pads, shorter than pronotum, separated by an interval equal to about two-thirds the tegminal width.

Ovipositor valves short, stout, with apices moderately curved.

Coloration.—Male. Head, pronotum and pleura chalcedony yellow (greenish), the face and sides of the fastigium blackish-brown, with the carinae showing yellowish, broad postocular bands of blackish-brown sharply define the remaining pale broad dorsal medio-longitudinal stripe, these dark bands velvety black dorsad on the pronotum; on each side another dark lateral band of equal width is also present, somewhat irregular, black on the lateral lobes of the pronotum with a pale dot of the general color dorso-mesad, reappearing on the pleura only as two black suffusions. Antennae blackish-brown, the two proximal joints and adjacent portion of frontal costa courge green. Tegmina with anal field milky, remainder blackish-brown, proximad with a streak of chalcedony yellow at costal margin, transparent and colorless distad. Abdomen cinnamon-brown dorsad, with a broken stripe of blackish-brown on each side; ventral surface of abdomen yellowish, tinged particularly proximad with rufous. Cephalic and median limbs courge green. Caudal femora rufous, becoming slightly paler and more yellowish near the genicular areas which are entirely black; caudal tibiae pale coerulean blue, the spines and spurs black distad.

Female. Showing the same pattern as the male, but differing as follows. Medio-longitudinal bands of head and pronotum ochraceous-buff, becoming darker caudad, continued on abdomen and evident on the tegmina as a very narrow border of the sutural margin. Sides of head and pronotum biscay green, the postocular bands indicated only as narrow black borders of the medio-longitudinal pale band on the pronotum, the lateral bands present only as dark brown suffusions of the lateral lobes of the pronotum. Tegmina almost entirely blackish mummy brown with a broad border of the costal margin pinard yellow, the colorless distal area seen in the male being absent by atrophy of the tegmina.

Measurements.—The measurements of the type are given first for the male sex, those of the female are of the allotype: length of body, ♂, 9.9-10 mm.; ♀, 15.3: median length of pronotum, ♂, 2-2; ♀, 2.7: greatest pronotal width, ♂, 2.1-2.1; ♀, 2.9: length of tegmen, ♀, 4.7-4.7: ♀, 2.1: length of caudal femur, ♂, 7.2-7.3; ♀, 10.1.

In addition to the described pair we have before us a male paratype bearing the same data, and a male paratype taken 13 kilometers south of Pinar del Rio, Pinar del Rio Province, Cuba (September 14, 1913; (F. E. Lutz; in grass in sandy pine woods)), both from the American Museum Collection.

Sphingonotus haitensis (Saussure)

1861. *Oe[dipoda] haitensis* Saussure, Rev. et Mag. de Zool., (2), XIII, p. 323. [Haiti.]

1884. *Sph[ingonotus] jamaicensis* Saussure, Prodromus Oedipodiorum, p. 202. [♂; Jamaica.]

HISPANIOLA: St. Marc, Haiti; III, 30 and IV, 2, 1922; (F. E. Watson; on dry area); 2♂, 2♀; [A.M.N.H.]. La Serre, Haiti; III, 3, 1922; (F. E. Watson; dry region); 1♀; [A.M.N.H.].

Port-au-Prince, Haiti; I, 1-6, 1922; (F. E. Watson; on limestone hills); 1 ♂ ; [A.M.N.H.]. La Moriniere, Haiti; III, 1-5, 1922; (F. E. Watson; dry region); 2 ♂, 1 ♀ ; [A.M.N.H.]. Maneville, Haiti; II, 6-10, 1922; (F. E. Watson); 1 ♂ 2 ♀, [A.M.N.H.]. Fond Parisien, on Lake Assuei (or Étang Saumâtre). Haiti; II, 13-17, 1922; (F. E. Watson); 4 ♂, 2 ♀, 2 juv.; [A.M.N.H.]. Balan, east shore of Lake Assuei (or Étang Saumâtre), Haiti; II, 18, 1922; (F. E. Watson; in dry area of coral and sand with scant vegetation); 1 ♂ ; [A.M.N.H.]. Santiago, Dominican Republic; XI, 29-XII, 8, 1918; (H. B. Sherman); 2 ♂, 2 ♀ ; [Mus. Univ. of Michigan]. Monte Cristi, Dominican Republic; V. 6, 1916; (F. E. Watson; dry area with cactus and other vegetation); 4 ♀ ; [A.M.N.H.]. Moca, Dominican Republic; I, 1922; (E. Kaempfer); 5 ♂, 10 ♀ ; [A. N. S. P.].

Jamaica: Portland Parish; (C. W. Johnson); 1 ♀ ; [A.N.S.P.]. Rio Cobre, near Bog Walk, St. Catharine Parish; X, 25, 1913; (Hebard; in dry sandy stream wash; 1 ♂, 1 juv.; [Hebard Cln.]. Constant Spring, near Kingston, St. Andrew Parish; 1, 4, 1920; (F. E. Watson); 1 ♀ ; [A.M.N.H.]: VII, 5, 1920; (Rehn and Hebard; occasional on pebbly bar in dry stream bed); 5 ♂, 5 ♀ ; [A.N.S.P. and Hebard Cln.]. Mona Great House, near Kingston, St. Andrew Parish, elev. 550-600 feet; VIII, 3-4, 1923; (Rehn; on bare spots of dry hills); 2 ♀ ; [A.N.S.P.]. Liguanea Plain, near Kingston; VII, 5, 1920; (Rehn and Hebard; on dry tree-dotted plain); 1 juv.; [Hebard Cln.]. Kingston, VIII, 30, 1891; (T. D. A. Cockerell); 2 ♀ ; [Hebard Cln.]. Beach at south end of Long Mountain, St. Andrew Parish; VIII, 5, 1923; (Rehn; numerous in stony wash leading to sea, often crouching and failing to fly when swept over); 11 ♂, 10 ♀, 1 large juv. ♀ ; [A.N.S.P.].

Porto Rico: Ensenada; VI, 14-19, 1915; (Lutz and Mutchler; in usually dry or beach situations, harbor shore, mangrove salt flat, dry areas with cactus and grassland); 5 ♂, 7 ♀, 2 juv.; [A.M.N.H.]. Coamo Springs; VI, 5-6, 1915; (Lutz and Mutchler; in river flat and savanna); 5 ♂, 8 ♀ ; [A.M.N.H.]. Manati; VI, 27, 1915; (Lutz and Mutchler; on dry sandy area with largely xerophytic plant cover); 1 ♂ ; [A.M.N.H.].

Examination of the considerable series now at hand convinces us of the synonymy given above. Saussure separated the material which he described as *jamaicensis* because it had the distal portion of the wings suffused as a whole, while the Haitian insect was considered to possess instead an incomplete suffused band. The present series shows this to be purely individual, in this feature the wings varying from one extreme having the entire distal portion suffused, through a banded condition to an opposite extreme in which a rounded suffused area alone is present.

Compared with the very closely allied *S. cubensis* Saussure, the present species is found to differ in the slightly more graceful form, slightly rougher pronotal surface and weaker blue of the wing disk, while the caudal tibiae range from yellowish to veronese green (never as richly colored or as blue as in *cubensis*) with two broad brownish annuli, these individually ranging from well defined to subobsolete, usually weak (but a single annulus present in *cubensis*).

The Jamaican series have the caudal tibiae averaging more yellowish, the Hispaniolan ones have these averaging more greenish. No constant difference exists, however, which would warrant the recognition even of geographic races.

Bruner has recorded this insect from Oaxaca and Mitla, Mexico.[11] Examination of the material from the latter locality shows it represents instead *Platylactista micrus* Hebard,[12] a member of a genus of continental distribution. There is every reason to believe the Oaxaca material, now in the British Museum of Natural History, will also be found to have been erroneously determined. As far as present knowledge goes *haitensis* occurs only in Jamaica, Hispaniola and Porto Rico.

The Cuban record of *S. haitensis* given by Saussure[13] was almost certainly based on a specimen of *cubensis* showing a suffused area on the wings. That author erred in attributing specific diagnostic value to the extent of the wing suffusion. Gundlach has stated that while *cubensis* was very common in Cuba he had not seen *haitensis* in that island.

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[11] Biol. Cent.-Amer., Orth., II, p. 188, (1906).

[12] Trans. Amer. Entom. Soc., LVIII, p. 255, (1932).

[13] Prodr. Oedip., p. 202, (1884).

Sphingonotus cubensis Saussure

1884. *Sph[ingonotus] coerulans cubensis* Saussure, Prodromus Oedipodiorum, p. 201. [Cuba.]

CUBA: 12½ kilometers south of Pinar del Rio, Pinar del Rio; XI, 13, 1913; (Lutz; in sandy pine woods resembling those of Florida); 2 ♂, 1 ♀; [A.M.N.H.]. Havana, Havana; (C. F. Baker); 1 ♂, 1 ♀; [A.N.S.P.]. Santiago, Oriente; VIII, 21, 1920; (Hebard; in area of short dry grasses in low hills); 1 ♀; [Hebard Cln.]. Isle of Pines; 2 ♂, [M.C.Z.].

We believe that this insect is distinct from the Old World *S. coerulans* (Linnaeus), of which Saussure originally considered it merely a subspecies. Compared with material of the latter, *cubensis* shows very close agreement but is separable by the following features.

Size averaging smaller. Cephalic portion of pronotum less hirsute. Tegmina with convexity of costal margin proximad slightly more decided. Internal surface of caudal femora with two broad pale transverse bands (in *coerulans* broadly blackish terminated distad by a pale transverse band, sometimes showing traces of a median but always incomplete transverse band); caudal tibiae and bases of spines blue (in *coerulans* very pale bluish with bases of spines even paler). We find that *haitensis* differs similarly from *coerulans* in the coloration of the caudal tibiae.

In *cubensis* the wing disk is a deeper richer blue than in *haitensis*, the wing band is obsolete or present to varying degrees, ranging to a condition in which it is very broad and heavy. It is noteworthy, however, that the wing band when present never shows a tendency to invade the distal portion of the wing, a peculiarity that occurs only in certain Jamaican individuals of *haitensis*, the variational range within that species from that island alone covering from a minimum suffused area to the opposite extreme in which the entire distal portion of the wing is heavily suffused.

In the present series the caudal tibiae range in color from a rich blue to a greenish blue (i.e. squill blue to nile blue).

CYRTACANTHACRIDINAE

Group *Leptysmae*

Leptysma tainan new species (Text-figs. 1 and 2.)

This insect is closely related to Bruner's *L. minima*,[14] but may readily be distinguished by its larger size, somewhat more elongate fastigium, with its lateral margins more distinctly angulate and showing weak convexity, instead of these being straight convergent, in the proportionately smaller male ultimate sternite (subgenital plate) with its distal production decidedly narrower and much more narrowly truncate, as well as in apparently diagnostic differences in coloration of the abdomen and caudal limbs. (For male ultimate sternite of *L. minima* see text-fig. 3.)

Both *L. minima* and *tainan* are readily distinguishable from *L. marginicollis* (Serville), a species found in the southeastern United States, by the much more slender general form, as well as that of the caudal femora, and the proportionately much more elongate fastigium. From the South American *L. obscura* (Thunberg), the northern South American and Central American *L. insularis* (Bruner) and the northern South American *L. perlonga* Hebard, both *minima* and *tainan* are readily separable by the simple ultimate sternite (subgenital plate), of the male sex, which bears no specialized process above its caudal extremity.

Type.[15] — ♂ ; El Guama, Pinar del Rio Province, Cuba. March 9. (Palmer and Riley.) [United States National Museum.]

Size medium; form very slender, even for this genus of attenuate types, similar to that of *L. perlonga*.

Head smooth; frontal costa as in *minima*; interocular space very narrow, with usual sulcation obsolete;[16] fastigium elongate, but proportionately shorter than in *perlonga*, less than twice as long as its proximal width, distinctly shorter than the eye, its dorsal surface showing weak convexity and merely a trace of a medio-longitudinal sulcation, its margins distinctly cingulate and convergent in a feeble convexity to the moderately sharp but narrowly rounded apex. Antennae strongly ensiform (apices missing).

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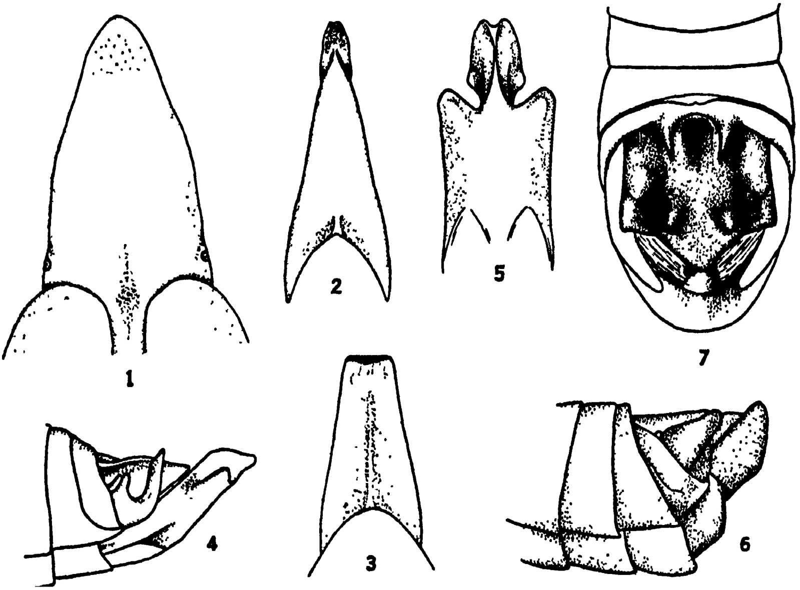
[14] Journ. N. Y. Entom. Soc., XIV, p. 152 (1906); [♂, Island of Trinidad]. Material of this species from Venezuela and British Guiana is in the Philadelphia Collections.

[15] This specimen was recorded as *L. minima* by Rehn in 1909 (Second Report Centr. Exper. Sta. Rep. Cuba, p. 205), at which time no material of that species was available for comparison. It is almost certainly this species which was recorded from Cuba as *L. filiformis* (Serville) (= *obscura*) by Bolívar and Gundlach, the latter giving a definite record from the Ciénaga de Zapata.

[16] Presence or absence of this, however, is apparently a variable feature in *Leptysma*.



Text-fig. 1.—*Leptysma tainan* new species. Dorsal view of fastigium of male (*type*). El Guama, Pinar del Rio, Cuba. (Greatly enlarged.) Fig. 2.—Same individual as figure 1. Ventral view of ultimate sternite (subgenital plate). (Greatly enlarged.) Fig. 3.—*Leptysma minima* Bruner. Ventral view of distal portion of ultimate sternite (subgenital plate) of male. Kaieteur, British Guiana. (Greatly enlarged.) Fig. 4.—*Opshomala caribea* new species. Lateral view of apex of abdomen of male (*type*). Sanchez, Dominican Republic, Hispaniola. (Greatly enlarged.) Fig. 5.—Same individual as figure 4. Ventral view of ultimate sternite (subgenital plate). (Greatly enlarged.) Fig. 6.—*Schistocerca quisqueya* new species. Lateral view of apex of abdomen of male (*type*). Moca, Dominican Republic, Hispaniola. (Greatly enlarged.) Fig. 7.—*Dellia gemmicula* new species. Dorsal view of apex of abdomen of male (*type*). Pleasant Hill, Blue Mts., Jamaica. (Greatly enlarged.)

Pronotum cylindrical, its surface finely punctulate; median carina and transverse sulci very weak but appreciable; metazona of disk three-fifths as long as prozona of same; cephalic margin of disk truncate, caudal margin of disk very broadly convex and with an emargination indicated mesad, the convexity as a whole decreased more markedly than in *minima*.

Tegmina and wings very narrow, their apices acute. Ultimate tergite (supra-anal plate) constricted at cercal apices, distal portion produced in an elongate triangular process, proximal portion with lateral bordering carinae of medio-longitudinal sulcus partially darkened, dark tubercles meso-laterad and proximad on each lateral margin: cerci curved sharply dorsad, erect portion showing slight flattening with brief dark apex acute, though not as sharply so as in *minima*: ultimate sternite (subgenital plate) lacking a specialized rostrate distal process, instead being flattened disto-dorsad and produced into a narrow, delicate, dorsally concave projection, the apex of which is bluntly rounded.

Caudal femora very slender; caudal tibiae moderately expanding distad, armed with eight to ten dorso-external spines.

Coloration.—Dorsal surface of body and antennae, external surface of caudal femora and lateral surfaces of abdomen clay color. A broad white band runs from the eyes across the genae, the lateral lobes of the pronotum at the ventral margin and across the median portion of the pleura, toward which white line the dorsal color becomes a darker brown. Head with a very narrow portion of the genae ventrad of this white band bister, this tone becoming slightly paler on face and ventral surface of antennae. Abdomen heavily suffused dorsad with shining blackish chestnut-brown. Cephalic and median limbs sayal brown. Caudal femora internally shining cinnamon-rufous; caudal tibiae very weak and dull glaucous-gray, becoming blackish distad, spines and spurs black-tipped, the latter elsewhere buffy.

Measurements.—The measurements of the unique type are: length of body, 33 mm.; length of fastigium from interocular space, 2.7; greatest width of fastigium, 1.6; length of pronotum, 4.8; caudal width of pronotum, 2.1; length of tegmen, 30.7; length of caudal femur, 13.

Opshomala caribea new species (Text-figs. 4 and 5.)

1888. *A[rnilia] mexicana* Bolívar, Mém. Soc. Zool. France, I, p. 146. (Not *Opomala mexicana* Saussure, 1861, which = *Leptysma marginicollis* (Serville).) [Cuba, "Gundlach No. 53-100."]

1890. *Arnilia mexicana* Gundlach, Contrib. Entom. Cubana, IV, p. 345. (Not *Opomala mexicana* Saussure, 1861, which = *Leptysma marginicollis* (Serville).) [Bayamo, Ciénaga de Zapata and Cárdenas, Cuba.]

1916. *Arnilia saussurei*[17] var. geogr. Carl, Rev. Suisse Zool., XXIV, p. 511. [♂; Cuba.]

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[17] This insect, described from Cayenne, is unquestionably the same as that which we consider *O. cylindrodes* Stål.

This insect belongs to the same phylum as *O. cylindrodes* Stål, a species widely distributed over tropical South America and found as far north as Panama. It is also near *O. minor* (Bruner), a closely related Guatemalan species. From *cylindrodes* these species are separable by the decidedly less produced character of the structure which forms the distal part of the male ultimate sternite (subgenital plate). Whereas *caribea* agrees with *cylindrodes* in the form of the fastigium and of the male cerci, and also is apparently a somewhat larger insect, *minor* appears to be a slightly smaller species with the fastigium more produced, more decidedly triangular and less blunt, even to a greater degree than in *O. cylindrodes* (Marshall).[18]

It is evident that *caribea* is very closely related to *cylindrodes*, and if the male genitalic characters were not so uniformly constant in the eleven individuals of that sex now before us, showing features readily separating this insect from the available series of males of *cylindrodes* from numerous and widely separated localities, we would not feel justified in describing *caribea* as distinct.

Type.—♂; Sanchez, Dominican Republic, Hispaniola. May 27, 1915. (F. E. Watson; along railroad track through heavy tropical swamp.) [American Museum of Natural History.]

Size rather large for genus, averaging larger than *cylindrodes*; form normal, slender.

Interocular space distinctly more than half as wide as proximal antennal joint; fastigium slightly shorter than its greatest width including the comparatively prominent lateral ocelli, its surface showing no sulcation and the lateral margins feebly convex to the blunt apex: frontal costa decidedly sulcate dorsad to approximate the level of the lateral ocelli, at which point its width is greatest.

Pronotum cylindrical, with weak lateral shoulders indicated caudad, its surface finely but conspicuously impresso-punctulate, this more uniform and decided than in *cylindrodes*, slightly more decided than in *minor*.

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[18] This is a species of the southeastern United States, having distinctive male genitalic features. The male cerci in *cylindrodes* taper to acute apices instead of showing an oblique distal truncation, the specialization of the male ultimate sternite is nearest that of *O. caribea*, but in degree of production it is about intermediate between the condition found in the latter species and in *cylindrodes*.

Tegmina and wings fully developed, extending distinctly caudad of apices of caudal femora; tegminal apices rounded, slightly less acute than in *cylindrodes*, distinctly less acute than in *minor*.

Penultimate abdominal tergite lacking the four dark nodes found in *cylindrodes* and *minor*, but with that portion of its distal margin in contact with ultimate tergite slightly thickened and darkened throughout: ultimate tergite (supra-anal plate) with lateral margins thickened and raised, weakly convex convergent distad, then the whole is sharply narrowed, so that the distal portion is cut off as a lamella which itself narrows slightly to the rounded apex, and is about as long as its proximal width: cerci first directed ventrad, then twisted and curving dorsad, the distal portion erect, about twice as long as broad, with margin of the oblique truncate apex black: ultimate sternite (subgenital plate) elongate, terminating distad in two rounded lobes which are slightly heavier than in *cylindrodes*, between these a stout, almost subchitinous neck is directed dorso-distad, its dorsal surface concave with distal apex weakly bilobate, so briefly produced distad that the dorsal plate thus formed is scarcely longer than the base of the neck.

Caudal tibiae enlarged distad, with dorsal margins in that portion finely lamellate, dorso-external margin armed with seven to nine (normally seven in series) small delicate spines.

Allotype.—♀: same data as type. [American Museum of Natural History.]

Differing from the preceding description of the male sex in the following noteworthy features.

Size larger; form more robust.

Interocular space slightly wider than proximal antennal article,[19] separated from the fastigium by a distinct transverse sulcus; fastigium broader.[20] Antennae proportionately shorter.

Ultimate sternite (subgenital plate) shallowly V-emarginate on each side of the acute, very narrow and elongate triangular median production of distal margin. Ovipòsitor valves very short, strongly toothed.

Coloration.—General coloration courge green (Ridgway), with a broad whitish lateral band of each side, on genae, lateral lobes of pronotum and on pleura. Dorsum of pronotum and tegmina often weakly tinged with testaceous. Abdomen with a broad medio-dorsal brownish or purplish stripe, which on the distal tergites encloses a pair of (frequently conspicuous) buffy flecks. Ventral surface yellowish. Caudal tibiae tinged with green (probably brighter in life).

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[19] Seen in a series to vary individually to subequal in width.

[20] Rarely this shows a faint trace of median sulcation.

Measurements (in millimeters)

	Length of body	Width of head across eyes	Length of pronotum	Length of tegmen	Length of caudal femur
♂, Carrefour, Haiti	24.5	3.6	4.7	23.7	13.4
♂, Sanchez, Dom. Rep., *type*	27	3.8	4.8	23.8	14.7
♂, " San Domingo ", average of nine	24.8-26.5	3.7-3.8	4.7-4.9	22.2-24	13.2-14.7
♀, Sanchez, Dom. Rep., *allotype*	33.2	4.4	5.9	29	18
♀, Sanchez, Dom. Rep., *paratype*	33	4.3	5.9	28.8	17.3
♀, " San Domingo ", *paratype*	32.8	4.2	5.6	27.3	16.8

Specimens examined: 14; 11♂, 3♀.

Carrefour, Haiti, Hispaniola; IV, 8, 1922; (F. E. Watson); 1♂; [A.M.N.H.].

Sanchez, Dominican Republic, Hispaniola; V, 27, 1915; (F. E. Watson; along railroad track through heavy tropical swamp); 1♂ (*type*), 2♀ (*allotype* and *paratype*); [A.M.N.H.].

" San Domingo " (= Dominican Republic), Hispaniola; (M. A. Frazer); 9♂, 1♀ (*paratypes*); [M.C.Z., A.N.S.P. and Hebard Cln.].

Remarks.—This is clearly the species which has been recorded from Cuba in error as *Arnilia mexicana* (vide supra). The name *mexicana* is now known to have been based on a quite different insect, a species of the genus *Leptysma, mexicana* having recently been established by Hebard as a synonym of the older *marginicollis* (Serville). Without Cuban males for comparison we would feel less certain of the identity of Cuban material, were it not that the description of males from that island given by Carl (vide supra) shows conclusively what he had before him. That author was in error in supposing that the present genus had not previously been reported from the Antilles, as the references given above demonstrate.

The history of the generic names which have been applied to the genus for which the name *Opshomala* of Serville is now properly used has been reviewed by Hebard.[21]

Group *Cyrtacanthacres*

Schistocerca quisqueya new species (Text-fig. 6; pl. X, fig. 6.)

This handsome and very diminutive species is known only from Hispaniola. It is related to *S. columbina* (Thunberg), but may be distinguished by the much smaller size and distinctive bicoloration of the caudal tibiae in males, these being green proximad with the remaining portions and tarsi red, this feature, however, often obscurely indicated or absent in females. Smaller and less robust even than *S. damnifica* (Saussure), *quisqueya* is one of the most distinctive of the genus.

Type.— ♂ : Moca, Province of Espaillat, Dominican Republic, Hispaniola. January, 1922. (E. Kaempfer.) [Academy of Natural Sciences of Philadelphia, Type no. 5398.]

Size very small (for genus); form slender.

Interocular space slightly greater than width of frontal costa between antennal bases: fastigium slightly broader than long, distinctly declivent ventro-cephalad, its dorsal surface distinctly concave: frontal costa showing slightly the greatest width briefly dorsad of antennal bases, its surface deplanate and impresso-punctate but becoming concave toward and ventrad of median ocellus, the margins there, however, but weakly carinate. Antennae appreciably exceeding the combined length of head and pronotum.

Pronotum with lateral shoulders distinct only on metazona and there broadly rounded; disk moderately convex cephalad, deplanate caudad; median carina distinct but not prominent, cut by all the principal transverse sulci; prozona distinctly longer than metazona; caudal margin of disk obtuse-angulate but with apex well produced and broadly rounded.

Tegmina and wings well surpassing apices of caudal femora, the tegmina unusually narrow for genus.

Ventral surface rather hirsute. Prosternal spine cylindrical, elongate, with apex rounded, straight and showing but slight deflection caudad. Interspace between mesosternal lobes cordiform.

Cerci half again as long as proximal depth, gradually tapering to the narrowly truncate apex. Ultimate sternite (subgenital plate) with distal emargination shallow and strongly concave.

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[21] Trans. Amer. Entom. Soc., XLIX, p. 246, (1923).

Allotype.— ♀ : Petionville, Haiti, Hispaniola. Elevation about 1700 feet. January 24-25, 1922. (F. E. Watson; on Mali trail.) [American Museum of Natural History.]

Differing from the above description of the male sex (type) in the following noteworthy features.

Size much larger; form more robust.

Fastigium distinctly broader than long; supplementary carinae of face and carinate lateral margins of frontal costa decided, the latter more prominent than in male.

Median carina of pronotum slightly more prominent on metazona.

Tegmina and wings reaching to apices of caudal femora.

Ovipositor valves robust, normal for genus. Interspace between mesosternal lobes cuneiform, its greatest width distinctly less than its length.

Coloration.—Male. Face, broad medio-longitudinal bar on head and pronotum, cephalic and median limbs and proximal third of caudal tibiae apple green, remaining parts of caudal tibiae and tarsi nopal red, the tibial spines and spurs buffy with black tips. Other portions of head cinnamon-brown, eyes and antennae ochraceous tawny, the latter becoming greenish yellow proximad. Other sections of pronotum cinnamon-brown becoming mummy brown toward medio-longitudinal bar, this darker color occupying the cephalic section of the prozona of the lateral lobes, two longitudinally disposed dots of warm buff placed mesad in this area, ventral margin of lateral lobes warm buff with dorsal boundary of this marking straight, becoming declivent caudad. Tegmina prout's brown, becoming paler dorsad, immaculate except for a greenish white longitudinal streak in the marginal field. Caudal femora buckthorn brown washed with whitish on ventral portion of external pagina, showing two weak suffused cross bands of darker brown dorsad and with flecks of darker brown along the carinae; caudal tibiae as described at head of coloration.

The other males appear discolored to various degrees, but probably in life lacked green on the head, pronotum and tegmina, the face and medio-longitudinal dorsal bar being light brown in preserved specimens. It is possible that in these respects the species is dichromatic.

Female. Exactly as in male type, described above, except that the cephalic and median limbs are brown, the proximal portion of the caudal tibiae are greenish brown ventrad but buffy dorsad, and the proximal dorsal bar of the caudal femora is extended as a longitudinal suffusion of dark brown dorsad in the external pagina. The other females have the caudal tibiae reddish becoming buffy proximad. In all of this sex the tibial spines and spurs are dark at their bases, then conspicuously yellowish buff with distal portions black.

Measurements (in millimeters)

	Length of body	Length of pronotum	Length of metazona of pronotum	Caudal width of pronotal disk	Length of tegmen	Greatest width of tegmen	Length of caudal femur
♂, Moca, Dom. Rep., *type* ..	20	5	2.4	2.9	16.2	3	12.7
♂, Moca, Dom. Rep. *paratype*	23	5.3	2.6	3	20.8	3.2	15.2
♀, Petionville, Haiti, *allotype*	36.4	7.3	3.6	4.8	25.7	4.3	20.2
♀, " San Domingo " *paratypes*, extremes ...	32.8-34.8	6.8-7.8	3.3.-3.8	4.2.-4.8	24.4-28.2	3.8-4.4	18-19.8

Specimens examined: 12; 8 ♂, 4 ♀.

HISPANIOLA: Moca, Dominican Republic; I, 22-I, 26, 1922; (E. Kaempfer); 3 ♂ (*type* and *paratypes*); [A.N.S.P.]. Santiago, Dominican Republic; XII, 5, 1918; (H. B. Sherman); 1 ♀ (*paratype*); [Mus. Univ. Mich.]. San Francisco Mountains, 13 kilometers N. of San Cristobal, Prov. of San Domingo, Dominican Republic; VII, 6, 1905; (A. Busck); 1 ♂ (*paratype*); [U.S.N.M.]. "San Domingo" [= Dominican Republic]; (M. A. Frazer); 4 ♂, 2 ♀ (*paratypes*); [M.C.Z.]. Petionville, Haiti, elevation 1700 feet; I, 24-25, 1922; (F. E. Watson); 1 ♀ (*allotype*); [A.M.N.H.].

Group *Coscineutae*

Dellia gemmicula new species (Text-fig. 7; pl. X, fig. 5.)

This Jamaican species is the first of true *Dellia* to be discovered outside of the island of Cuba. Three Costa Rican species described years ago by Rehn as forms of this genus have since been assigned to a related continental genus *Lithoscirtus*.[22] Though clearly congeneric with *D. insulana* Stål,[23] the genotype, the present species is strikingly differentiated by its smaller size, very distinctive colors and color pattern, stronger pronotal sulci, even more strongly atrophied tegmina and characteristic male genitalic features, in which marked furcula are developed, the ultimate tergite expands slightly to the distal margin and the cerci are curved inward. No closer affinity exists with Carl's D. *multicolor,*[24] with material of which, as well as of *insulana,* the new species has been compared.

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[22] See Rehn, Trans. Amer. Ent. Soc., LV, pp. 14-32, (1929).

[23] Bihang till K. Svenska Vet-Akad. Handl., v, no. 4, p. 83, (1878); [♂, Cuba].

The species is apparently very local and very difficult to secure. All of the specimens seen were taken by the senior author in late July, 1923, from a single area of vine tangles on a cut bank along a trail. At first only immature individuals were taken, but as the form was recognized as a *Dellia,* persistent work finally was rewarded by the capture of an adult male, the sole adult secured during a two weeks' stay.

The locality (Pleasant Hill) is a coffee estate at an elevation of 3700-3800 feet in the Blue Mountains nearly a thousand feet below the edge of the mountain forest reserve.[25] Work on numerous occasions in the latter environment did not produce *Dellia,* although many other striking endemics were secured. The individuals taken were not particularly active, but when once thoroughly disturbed jumped with great speed.

Type.— ♂ : Pleasant Hill, Blue Mountains, Jamaica. Elevation, 3700-3800 feet. July 27, 1923. (J. A. G. Rehn.) [Academy of Natural Sciences of Philadelphia, Type no. 5397.]

Size small; form moderately slender; surface smooth and shining except as noted below.

Head with eyes large and protruding, in depth almost equal to three times length of prominent infra-ocular sulcus; interocular interval less than width of frontal costa at fastigio-facial angle: fastigium slightly broader than long, its surface weakly concave, lateral ocelli visible from dorsum; lateral margins of fastigium convergent and very feebly concave to the bluntly rounded apex, ventrad of apex when seen from dorsum the deplanate frontal costa is visible, the fastigio-facial angle being smoothly rounded in profile: frontal costa percurrent, with a shallow but broad sulcus ventrad of median ocellus, dorsad of this weakly projecting, moderately expanded with surface deplanate and smooth except for a few submarginal impressed punctae, lateral margins becoming carinate only toward ventral portion of this area: face with a few impressed punctae, supplementary carinae prominent.

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[24] Rev. Suisse de Zool., xxiv, p. 512, (1916); [♀, Cuba].

[25] A description of conditions at Pleasant Hill and in the adjacent areas will be found in "An Entomologist's Summer Visit to Jamaica and Costa Rica" (Year Book Acad. Nat. Sci. Phila., 1923, pp. 17-22, (1924)).

Pronotum short, evenly convex, with deep and regular transverse sulci (the normal three and one submarginal cephalad), so that intervening areas appear as broadly rounded transverse ridges, even more pronounced than in *Agesander ruficornis* Stål: cephalic margin of disk very broadly convex, showing weak median angulation; caudal margin of disk transverse, with a feeble median emargination: lateral lobes with ventro-caudal angle broadly rounded obtuse-angulate. Prosternum produced in a large blunt tubercle.

Tegmina minute, lobate.

Apex of abdomen weakly clavate. Furcula prominent, being two slender, parallel, digitiform productions which enclose a broadly V-shaped area. Ultimate tergite (supra-anal plate) slightly broader than long, its lateral margins broadly convex and weakly divergent to distal margin, and forming on it sharp, subrectangulate disto-lateral angles, the distal margin with its lateral sections transverse and its median portion forming the rectangulate apex; surface of lateral portions of ultimate tergite ascendant to the lateral margins, showing a large convexity on each side meso-distad, each separated from median portion of tergite by a broad, convex sulcus; median portion of ultimate tergite deplanate, with a broad medio-longitudinal sulcus in proximal half and a small conical projection at the lateral bases of the produced apex. Cerci simple, tapering gradually from the moderately broad base to the sharply rounded apex, evenly incurved, lying ventrad of the proximal part of the ultimate tergite and with their apices reaching to a point on each side of the apex of the ultimate sternite. Ultimate sternite (subgenital plate) short, evenly convex, its apex dorsal and median, broadly rounded.

Caudal femora moderately widening proximad, carinae smooth, ventral margins of genicular lobes decidedly convex produced: caudal tibiae hirsute, armed with six (sometimes seven) dorso-external spines: caudal tarsi with elongate articles, proximal decidedly longer than second, nearly as long as third.

A somewhat over half-grown female before us shows that the ovipositor valves closely resemble those of *D. insulana* at the same stage of development.

Coloration.—Head brownish olive, with broad medio-longitudinal and lateral postocular bars of black. Eyes metallic hays russet. Antennae cinnamon-rufous, except the two proximal articles which are courge green. Pronotum with margins narrowly and all of metazona dorsad on each side brownish olive, elsewhere black except for three successive areas dorsolaterad and two similar areas ventrad on lateral lobes, of carnelian red, separated by the sulci and bounded by the black areas. Remaining portions of body yellowish green, the abdomen with a broad medio-longitudinal black band, the furcula, prominences on the ultimate tergite and apices of cerci and ultimate sternite are also black. Limbs bright courge green, except as follows; all of cephalic femora, except apex, vinaceous-rufous, caudal femora with genicular areas black, caudal tibiae china blue shading to bright courge green proximad, with immediate bases and apices of spines and spurs black, caudal tarsi whitish with distal article tinged with green.

Measurements.—The measurements of the male type are: length of body, 14 mm.; length of pronotum, 2.8; greatest width of pronotum, 2.7; length of tegmen, 1.2; width of tegmen, .4; length of caudal femur, 13.8.

In addition to the type we have before us sixteen immature individuals in a number of instars including that immediately preceding the adult condition. These specimens were all taken at the same place and under the same conditions as the type, on dates ranging from July 19 to 29, 1923.

EXPLANATION OF PLATE X

Fig. 1.—*Orphulella decisa* (Walker). Lateral view of female (*allotype*). Moca, Dominican Republic, Hispaniola. (X 4.)

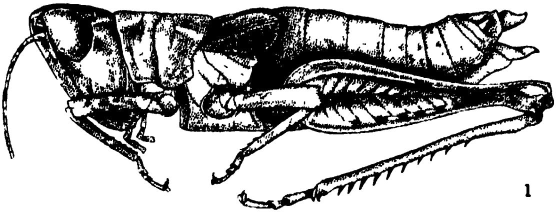
Fig. 2.—*Orphulella brachyptera* new species. Lateral view of male (*type*). Twelve and one-half kilometers south of Pinar del Rio, Cuba. (X 4.)

Fig. 3.—*Compsacrella poecila* new genus and species. Lateral view of male (*paratype*). Thirteen kilometers south of Pinar del Rio, Cuba. (X 4.)

Fig. 4.—*Compsacrella poecila* new genus and species. Dorsal view of female (*allotype*). Twelve and one-half kilometers south of Pinar del Rio, Cuba. (X 4.)

Fig. 5.—*Dellia gemmicula* new species. Lateral view of male (*type*). Pleasant Hill, Blue Mts., Jamaica. (X 4.)

Fig. 6.—*Schistocerca quisqueya* new species. Lateral view of male (*type*). Moca, Dominican Republic, Hispaniola. (X 3.)



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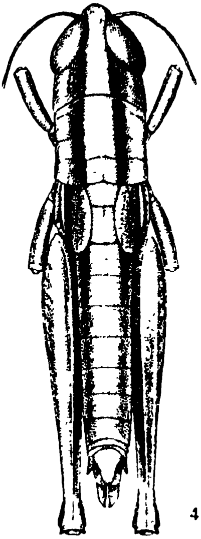

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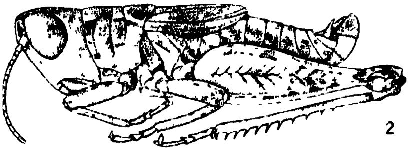

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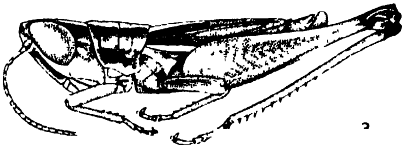

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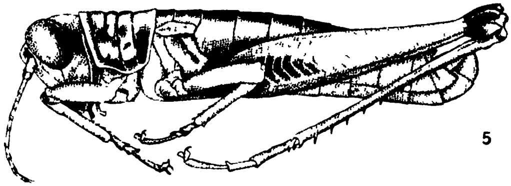

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6

REHN and HEBARD—WEST INDIAN ACRIDIDAE

STUDIES IN THE TIPHIIDAE

(HYMENOPTERA ACULEATA)

II. A Revision of the Nearctic Myzininae[1]

BY KARL V. KROMBEIN

Buffalo, New York

INTRODUCTION

The first North American Myzinine wasp was described by Fabricius in 1775. During the following century and a half numerous additional species from North America have been described by many authors. During all these intervening years no attempt has been made to present a comprehensive revision of the North American species which are proving to be of great economic importance in the control of " white-grubs ". Several years ago I became interested in the classification of Scolioid Hymenoptera and this paper presents the taxonomic results of an intensive study of one subfamily of this complex.

I am extremely indebted to Prof. J. C. Bradley and Mr. V. S. L. Pate of the Department of Entomology at Cornell University for their constant encouragement and many helpful suggestions. I acknowledge with gratitude the kindness of the officials of the Academy of Natural Sciences of Philadelphia and the United States National Museum at Washington for the privilege of examining the types deposited in those institutions. I am indebted to Dr. Bradley for comparison of specimens with certain of Fabricius' types in the Muséum National d'Histoire Naturelle, Paris and to Mr. J. F. Perkins for comparison of specimens with certain of Cameron's types in the British Museum (Natural History). Professors O. A. Johannsen of Cornell University and

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[1] I. A Review of the Genera of Myzininae. *Ann. Ent. Soc. Amer.*, xxx, pp. 26-30, 1937.

Clarence E. Mickel of the University of Minnesota have very kindly identified some reared parasites. I should also like to thank Messrs. S. A. Rohwer and A. B. Gahan of the U. S. Bureau of Entomology and Plant Quarantine for their kindness in allowing me the use of their notes on the genus *Myzine.*

The following persons and institutions have assisted me by the loan of material: Academy of Natural Sciences of Philadelphia [A.N.S.P.], through Mr. James A. G. Rehn; the United States National Museum [U.S.N.M.], Washington through Miss Grace Sandhouse; the American Museum of Natural History [A. M. N. H.] through Mr. Herbert F. Schwarz; the Illinois Natural History Survey [I. N. H. S.] through Dr. Theodore H. Frison; the University of Minnesota [U.M.] through Prof. Clarence E. Mickel; Cornell University [C.U.] through Prof. J. C. Bradley; Kansas State Agricultural College [K.S.C.] through Prof. R. H. Painter; University of Kansas [U.K.]; University of Colorado [U.C.]; Colorado State Agricultural College [C.S.A.C.]; Ohio State University [O.S.U.] through Prof. C. H. Kennedy; Prof. H. A. Scullen [H.A.S.] of Oregon State Agricultural College; the Texas Agricultural and Mechanical College [T.A.M.] through Prof. H. J. Reinhard; Dr. Francis X. Williams and Mr. O. H. Swezey, Experiment Station of the Hawaiian Sugar Planter's Association [H.S.P.A.]; Mr. C. S. Brimley [C.S.B.], North Carolina Department of Agriculture; Mr. A. B. Champlain, Bureau of Plant Industry [B.P.I.], Harrisburg, Penna.; Prof. Vasco M. Tanner and Mr. C. Lynn Hayward, Brigham Young University [B.Y.U.]; Prof. M. R. Smith, Mississippi State Agricultural College [M.S.A.C.]; Los Angeles Museum [L.S.A.G.]; Mr. Paul O. Ritcher, University of Wisconsin [U. W.]; Mr. L. P. Wehrle, University of Arizona [U.A.]; Mr. H. B. Parks [H.B.P.]; Mr. H. K. Townes [H.K.T.]; Mr. P. H. Timberlake [P.H.T.]; Mr. H. C. Severin [H.C.S.]; Mr. O. A Stevens [O.A.S.]; Mr. Wm. S. Marshall [W.S.M.]; Mr. J. E. Gillaspy [J.E.G.]; Prof. P. W. Fattig [P.W.F.], Emory University; Mr. George R. Ferguson [G.R.F.]; Mr. H. E. Milliron [H.E.M.].

Dr. Raymond Roberts has coöperated by sending the data on all specimens in the collection of the University of Nebraska (U.N.).

BIOLOGY OF THE NEW WORLD MYZININAE

So far as has been observed, the wasps of this subfamily are parasitic on beetle larvae. *Myzine* preys upon Scarabaeid larvae, particularly *Phyllophaga, Phytalus* and *Anomala; Pterombrus* parasitizes tiger beetle larvae of various genera, while the host or hosts of *Isotiphia* are unknown.

The Species of Myzine

There have been two notable contributions to our knowledge of the biology of this genus, that of Davis [2] who worked in Illinois, and that of Box,[3] in Porto Rico.

In Illinois the adults of *Myzine quinquecincta* (Fabr.) emerge in July. After mating the females enter the ground at night to search for the " white-grubs ". The beetle larva is permanently paralyzed by the wasp's sting and the egg is laid on the venter of its abdomen. The egg hatches in about two days and the wasp larva feeds externally, at first on the body juices alone, but eventually consumes the entire beetle larva except for the extremely chitinized parts such as the head capsule and legs. The entire larval growth is completed in from four to five days and the larva immediately begins to spin its elongate-elliptical brownish cocooon which is usually completed in another two days. The larva spends the entire winter in that stage, not transforming to a pupa until the following spring.

In Porto Rico *Myzine haemorrhoidalis* (Fabr.) and *Myzine xanthonotus* (Rohw.) require approximately the same length of time as *Myzine quinquecincta* until the cocoon spinning stage is reached, but the Porto Rican species spend only five to six weeks in the cocoon, so in all probability there are several generations a year.

The " white-grubs " are usually in their second or third instar when parasitized although I have seen such tiny adults of *Myzine quinquecincta* it seems not unreasonable to suppose that occasionally a beetle larva in an earlier instar is attacked, or else Scarabaeid larvae of other genera.

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[2] Davis, John J. *Illinois Nat. Hist. Surv. Bull.*, XIII, Art. 5, pp. 53-138, pls. 3-15, 1919.

[3] Box, Harold E. *Journ. Dept. Agr. Porto Rico,* IX, 291-356, 1927.

The males of some species have the peculiar habit of congregating in large numbers on wild vegetation such as *Erigeron canadensis* and spend the night hanging from the stems by their mandibles and legs or by their mandibles alone. Several authors have recorded this fact but the Raus[4] have studied them in great detail. They state that only the males behave in this way, and begin to congregate about their sleeping quarters as early as 5:30 P.M. and are quite shy while there is still a slight amount of daylight, taking to flight when disturbed. If disturbed about dawn they drop sluggishly to the ground or lower leaves and this habit doubtless makes them an easy prey for the early bird. On dull and cloudy days they remain in their dormitories in a sluggish condition. Those from any one area congrégate in this way every night and always on the same plant.

Davis[2] and Flint and Sanders[5] record finding cocoons of *Myzine* very commonly while following behind a plow, which would indicate that the grubs were parasitized at a depth of from four to six inches. Box[3] states that the female may sometimes drag the grub to a depth of two feet before making a cell around it.

Hayes[6] records rearing two Mutillids, which were identified by Mickel, from *Myzine quinquecincta* cocoons. One male *Dasymutilla permista* Mickel emerged July 20, 1923 and one female *Dasymutilla quadriguttata* (Say) emerged August 19, 1920, both at Lawrence, Kansas. I have examined the *Myzine* which emerged from the same lot of cocoons and they are all *quinquecincta* (Fabr.).

Swezey[7] records rearing a male *Mutilla castor* Blake, a female *Mutilla ferrugata* Fabr. and one *Anthrax fulvohirta* Wied. from cocoons of *Myzine quinquecincta* from Illinois. Suspecting a misidentification due to our inadequate knowledge of the Mutillidae at that time, I borrowed these specimens and also the *Myzine* that had emerged from the same lot of cocoons. The Mutillids were sent to Mickel who identified the male as *Dasymutilla*

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[4] Rau, Phil and Rau, Nellie. *Ann. Ent. Soc. Amer.*, IX, 234-236, 1916.

[5] Flint, W. P. and Sanders, G. E. *Journ. Econ. Ent.*, III, 490, 1912.

[6] Hayes, W. P. *Bull. Brook. Ent. Soc.*, XIX, 153, 1924.

[7] Swezey, Otto H. *Proc. Hawaiian Ent. Soc.*, III, 71-2, 1915.

permista Mickel and the female as *Dasymutilla interrupta* Banks. Johannsen determined the Bombyliid as *Villa fulvohirta* (Wied.). I have determined all the *Myzine* reared from this same lot of cocoons as *quinquecincta* (Fabr.), so the chances are that the four parasites were all reared from that species.

Box[3] records rearing *Anthrax gorgon* Fabr. from *Myzine haemorrhoidalis* (Febr.).

Myzine quinquecincta (Fabr.) has been reared by Davis[2] and Flint and Sanders[5] from cocoons bearing *Phyllophaga* remains. Gahan in describing *atriventris* (= *collaris* Say) records it as being reared from cocoons bearing *Phyllophaga* remains, and Davis[2] has also reared this species from the same host. *Myzine maculata* (Fabr.) (recorded as *interrupta* Say) has also been reared by Davis[2] from cocoons bearing *Phyllophaga* remains. Box[3] records rearing *Myzine haemorrhoidalis* (Fabr.) from *Phytalus apicalis* Blanch. and *Myzine xanthonotus* (Rohw.) from *Phyllophaga portoricensis* Sm.

The economic importance of *Myzine* species in the control of " white-grubs " cannot be over-estimated. Flint and Sanders[5] record some interesting figures for the rate of parasitism. In four plots of one acre each in a corn field plowed to a depth of four inches, they recovered seventy-five cocoons of *Myzine*, forty-one of *Tiphia* and three hundred and sixty-five living " white-grubs ", while in a plot plowed to a depth of six inches the count was two cocoons of *Myzine*, nine of *Tiphia* and forty-eight living " white-grubs ".

Economic entomologists desirous of rearing these wasps in large numbers for biological control work will find Box's[3] paper of the greatest importance so far as rearing techniques are concerned.

The Species of Pterombrus

The wasps of this genus are parasitic on the larvae of various genera of tiger beetles (Cicindelidae). While nothing is known of the biology of our single North American species, Williams[8] has studied the habits of two Brazilian species. He found *Pterombrus cicindelicidus* Williams to be a parasite of *Cicindela* larvae (species unknown). The female hunts for the larval burrows in clayey soil, running over the ground in a jerky fashion. When an occupied burrow is discovered, she plunges in without hesitation until only the tip of her abdomen is visible. After looking over her prey, she descends further, paralyzes it and lays her egg between the fifth and sixth sternites, to one side of the median line. The cell is constructed less than two inches below the surface of the ground. The egg stage lasts for slightly over two days and the wasp larva feeds externally. The larval stage is slightly over four days. Immediately the larva spins its cocoon which flares out at the cephalic end as in *Methoca* and is about nine millimeters long. The pupal stage is twenty-two days, so that the entire life cycle requires about four weeks.

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[8] Williams, Francis X. *Bull. Expt. Sta. Hawaiian Sugar Planters' Assoc.* (Ent. Ser.) no. 19, pp. 144-151, pl. 25, 1928.

Pterombrus iheringi Ducke is a larger species, parasitic on the larvae of the Cicindelid *Megacephala* (*Tetracha*) *affinis* Dej. The female began to dig through a plugged-up burrow, removing the earth a mouthful at a time, and finally reaching the larva after about forty-five minutes' digging. The wasp grasps the larva's head and stings it in the throat or thorax until it is motionless. The paralyzed larva is then pushed up near the top of the vertical tunnel while the wasp fashions a cell about forty-two millimeters below it; gouging the earth out from the sides of the tunnel with her mandibles and tamping it down at the bottom with the tip of her abdomen. The finished cell is about twenty millimeters long. When this is completed the larva is placed in the cell and an egg laid on the middle line of the venter. The wasp then plugs up the burrow, filling in directly on top of the armored head of the Cicindelid and making the plug about thirteen millimeters long. The earth in the plug is tamped down in a very peculiar manner (for wasps at least)—the abdomen is elongated and telescoped, pushing and packing the soil "almost as one might use the hand for that purpose"; she also uses her head for this purpose. Near the top of the plug the earth is merely pushed in and not tamped, and an unfilled portion of about nine millimeters is left at the top. The egg hatches in three to four days and the larva feeds for about six more before spinning a cocoon which is sixteen millimeters in length and rounded at each end.

CLASSIFICATION OF THE NEARCTIC MYZININAE

In my opinion the New World genera *Myzine* Latr., *Pterombrus* Smith and *Isotiphia* Ashm. together with several other genera from the Old World form a rather well-defined section of the Tiphiidae worthy of subfamily rank. All New World forms key down to the subfamily Tiphiinae in Comstock's Introduction (p. 910, couplet M), but can be easily separated from the Tiphiinae by the fact that the antennae of all Myzininae arise from beneath frontal ridges or tubercles.

Subfamily Characters.—Female. Antennae 12-segmented (apparently 11-segmented in some genera), arising from beneath frontal ridges or tubercles; winged, brachypterous or wingless; in the hind wing, the cubital vein arises beyond or is interstitial with the transverse median vein; tarsal claws cleft at the apex or with a tooth at the base on the inner edge; abdomen 6-segmented, the pygidium rounded at the apex.

Male. Antennae 13-segmented (apparently 12-segmented in some genera), arising from beneath frontal ridges or tubercles; winged; in the hind wing, the cubital vein arises before or is interstitial with the transverse median vein; tarsal claws cleft at the apex or with a tooth at the base on the inner edge; abdomen 7-segmented, the hypopygium armed with a recurved aculeus; apex of pygidium slightly to deeply emarginate for the reception of this aculeus.

Ashmead's[9] classification of the genera in this subfamily is unfortunately rather muddled. *Isotiphia* Ashmead is placed in the Cosilidae along with such genera as *Nursea* Cameron which is said by Turner[10] to be an aberrant Sphecoid, *Maurillus* Smith a Pompilid and *Fedtschenkia* Radoszkowski (= *Telephoromyia* Ashm.) a Sapygid; *Pterombrus* Smith is placed in the Tiphiidae; *Dimorphoptera* Smith, the female of *Anthobosca* (pars), is placed in the Myzinidae as well as *Pseudotiphia* Ashmead which Turner[10] states is an aberrant *Tiphia* with short wings. In some cases, at least in the Myzinidae, female characters are given under the male section of the key. Consequently it is no wonder that generic identifications in this key are extremely difficult or even impossible for the average worker.

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[9] Ashmead, William H. *Can. Ent.*, XXXV, pp. 4-7, 39-43, 1903.

[10] Turner, Rowland E. *Proc. Zool. Soc. London*, p. 725, 1912.

Key to the Genera of Nearctic Myzininae

1. Last sternite of abdomen armed with a recurved, dorsally directed aculeus; last tergite emarginate apically; abdomen 7-segmented; males 2
   Last sternite without such an aculeus; last tergite rounded apically; abdomen 6-segmented; females 3
2. Thorax black, abdomen red except for the first segment and the aculeus which are also black; inner margin of eyes gently concave and not angulate; mesonotum with only one pair of longitudinal furrows. *Pterombrus* Smith
   Thorax and abdomen black, spotted and banded with yellow; if any red is present on the abdomen it is confined to the last three segments; inner margin of eyes deeply and angulately emarginate; mesonotum with two pairs of longitudinal furrows ....*Myzine* Latreille[11]
3. Entire surface of pygidium longitudinally striate and opaque; mesonotum with two pairs of longitudinal furrows; abdomen black and yellow, or, rarely, entirely black; robust species .....*Myzine* Latreille
   Pygidium not striate but smooth and glabrous; mesonotum with only one pair of longitudinal furrows; abdomen black and red, or entirely black; slender species 4
4. Antennae clavate apically; abdomen entirely black; maxillary palpi 4-jointed, labial palpi 3-jointed ....*Isotiphia* Ashmead
   Antennae filiform; abdomen red except for the first segment which is black; maxillary palpi 6-jointed, labial palpi 4-jointed. *Pterombrus* Smith

ISOTIPHIA Ashmead

1903. *Isotiphia* Ashmead, Can. Ent., xxxv, p. 43. [♀.]
1907. *Huberia* Ducke (in part), Rev. d'Ent., xxvi, pp. 8-9. [♀.]
1907. *Pterombrus* Ducke (in part), Rev. d'Ent., xxvi, p. 146. [♀.]

GENOTYPE: *Isotiphia nigra* Ashmead. (Monobasic.)

♀. Head transverse; eyes large, touching the base of the mandibles, the inner margin gently concave and not angulate; mandibles bidentate, the inner tooth at the apical third and much shorter than the outer one; antennae 12-jointed, clavate apically; ocelli arranged in an equilateral triangle; maxillary palpi 4-jointed and much longer than the 3-jointed labial palpi.

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[11] In a recent paper, Pate (Ent. News, XLVI, pp. 265-7, 1935) has shown that the generic name *Myzine* Latr. must be applied to the North American species which until recently have been placed in *Elis* Fabr. by contemporary authors.

In another paper (Ann. Ent. Soc. Am., XXX, pp. 26-30, 1937) I have indicated that the genus *Myzine* is confined to the New World only, and that *Meria* Ill. must be used for the Old World species formerly placed in *Myzine*.

Thorax—pronotum and scutellum each longer than the mesonotum which has only one pair of longitudinal furrows; postscutellum short and transverse; propodeum gently declivous posteriorly; mesopleura moderately inflated.

Abdomen slender and fusiform; 6-segmented; pygidium glabrous and smooth.

Wings short and not reaching the apex of the abdomen; marginal cell acute at the apex and confluent with the costal margin of the wing for its entire length; three submarginal cells, the second and third each receiving a recurrent nervure; stigma large; in the hind wing the cubitus is interstitial with the transverse median vein; the discoidal vein is lacking, its position indicated by a fold.

Legs—middle and hind femora and tibiae slender and not fossorial; tarsi 5-jointed, the tarsal claws cleft, the outer tooth being much the longer.

♂. Unknown.

The genus has only one known species, *Isotiphia nigra* Ashmead.[12]

PTEROMBRUS Smith

1869. *Pterombrus* Smith, Trans. Ent. Soc. London, 1869, p. 302; pl. 6, fig. 1. [♀.]
1872. *Myzine* Cresson, Trans. Am. Ent. Soc., IV, p. 201. [♂.]
1895. *Engycystis* Fox, Proc. Cal. Ac. Sci., (2), V, pp. 262-264; pl. 21, figs. 1-5. [♀, ♂.]
1907. *Huberia* Ducke (in part), Rev. d'Ent., XXVI, pp. 5-8. [♀, ♂.]
1913. *Pterombrus* Ducke, Rev. Mus. Paulista, IX, pp. 107-122; pl. 3, fig. 5. [♀, ♂.]
1928. *Pterombus* (!) Williams, Bull. Hawaiian Sug. Plant. Assoc., 19, Ent. Ser., pp. 144-151; pl. 25, figs. 205-213. [♀, ♂.]

GENOTYPE: *Pterombrus aenigmaticus* Smith. (Monobasic.)

Pterombrus is very closely related to *Isotiphia*, the reduced palpi and clavate antennae of the latter being the chief morphological differences. Undoubtedly *Isotiphia* is only a sidewise specialization from *Pterombrus*, but the main morphological differences are so pronounced that I consider *Isotiphia* worthy of generic rank.

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[12] *Type.*—♀; Santarem, Brazil; [United States National Museum]. I have examined this type and it is in good condition except that the wings are lacking. As I have indicated elsewhere (*Ann. Ent. Soc. Am.*, XXX, p. 26, 1937) *Huberia clavicornis* Ducke is probably conspecific with Ashmead's species.

I have also seen one female from Tena, Ecuador, April 5, 1923, (F. X. Williams), [H.S.P.A.]. Ducke (1907) records it from Peru as well as a number of localities in Brazil. I include it here as eventually it may be taken within the United States.

Head transverse; eyes large, touching the base of the mandibles, the inner margin gently concave and not angulate; mandibles bidentate, the inner tooth at the apical third and much shorter than the outer one; antennae filiform, 12-jointed in the female, and 13-jointed in the male; ocelli arranged in an equilateral triangle; maxillary palpi 6-jointed and much longer than the 4-jointed labial palpi.

Thorax: pronotum and scutellum slightly longer than the mesonotum in the female and about subequal in the male, the mesonotum in both sexes having only one pair of longitudinal furrows; postscutellum short and transverse; mesopleura moderately inflated.

Abdomen slender and fusiform; 6-segmented in the female and 7-segmented in the male; pygidium in the female glabrous and smooth, in the male emarginate apically for the reception of the aculeus and usually punctate.

Wings short and not reaching to the apex of the abdomen; marginal cell acute at the apex and confluent with the costal margin of the wing for its entire length; three submarginal cells, the second and third each receiving a recurrent nervure; stigma large; in the hind wing the cubitus arises before or is interstitial with the transverse median vein; discoidal vein usually present.

Legs—middle and hind femora and tibiae slender and not fossorial; tarsi 5-jointed, the tarsal claws cleft, the outer tooth being much the longer.

The only North American species is *Pterombrus rufiventris* (Cress.), but other species of the genus have been recorded from Argentina, Brazil, Bolivia and British Guiana.

Pterombrus rufiventris (Cresson) (Text-fig. 2.)

1872. *Myzine rufiventris* Cresson, Trans. Am. Ent. Soc., IV, p. 201. [♂.]

1894. *Myzine rufiventris* Cameron, Biol. Cent.-Am., Hym., II, p. 258-9; pl. 12, fig. 23. [♂.]

1895. *Engycystis rufiventris* Fox, Proc. Cal. Ac. Sci., (2), V, p. 263; pl. 21, figs. 1-5. [♀, ♂.]

1897. *Myzine cressonii* Dalla Torre (nom. nov. for *Myzine rufiventris* Cress.), Cat. Hym., VIII, p. 122.

1907. *Huberia rufiventris* Ducke, Rev. d'Ent., XXVI, p. 8. [♀, ♂.]

1907. *Pterombrus rufiventris* Ducke, Rev. d'Ent., XXVI, p. 146.

1913. *Pterombrus rufiventris* Ducke, Rev. Mus. Paulista, IX, pp. 119-121. [♀, ♂.]

Dalla Torre's *cressonii* was proposed for *Myzine rufiventris* Cresson (*nec Meria rufiventris* Klug). Fortunately it is not necessary to use Dalla Torre's name since Klug's species was described as a *Meria* from Europe and is undoubtedly placed in the correct genus.

♀. 13 mm. long. Clypeus shining and bipunctate basally; front shining with large punctures of first degree density medianly and an impunctate median area posteriorly; vertex shining with large, scattered punctures; mesonotum with large, separated punctures; dorsal surface of propodeum indistinctly striato-punctate, the posterior surface rugose-reticulate laterally; mesepisternum with a transverse carina below the tegula set off by a groove posteriorly, the surface opaque and bipunctate; lateral surface of propodeum irregularly and finely striate anteriorly and rugose-reticulate posteriorly; abdominal segments glabrous and practically impunctate.

Black; a spot above the lateral corners of the clypeus yellowish-white; abdominal segments two to six inclusive ferruginous; wings dusky; venation dark brown basally and testaceous apically.

♂. 8-14 mm. long. Clypeus shining and bipunctate; front shining and more closely punctured than the vertex; pronotal disk, mesonotum and scutellum shining with large, well-separated punctures; postscutellum opaque with numerous extremely fine punctures; dorsal and posterior surfaces of propodeum shining and coarsely rugose-reticulate; mesepisternum shining with a transverse carina below the tegula set off posteriorly by a crenulate groove and with an indistinct crenulate groove extending posteriorly from its ventral termination; surface of mesepisternum with large, well-separated punctures; lateral surfaces of propodeum rugose-reticulate but not so coarsely as the rest of that segment; abdomen glabrous; tergites one to six with minute, well-separated punctures, the pygidium closely and minutely punctured.

Black; a small spot above the lateral corners of the clypeus yellowish-white; mandibles except basally and abdominal segments two to seven inclusive (except the aculeus), ferruginous; wings hyaline to dusky; venation dark brown to testaceous.

Type.—♂; Dallas County, Texas, (Boll).

I have not seen the type which is in the Museum of Comparative Zoology at Harvard University.

Specimens examined: 1♀, 13♂.

Virginia: 1♂, Norfolk, July 11, 1910 (F. A. Johnston) [U.S.N.M.].

North Carolina: 1♀, 3♂ Raleigh, July 29-Aug. 30, (on *Euphorbia marginata*); 1♂, Sept. 4, 1925. 1♂, Laurel Hill, June 22, 1922: (all C. S. Brimley). Three of these records were sent by Mr. Brimley and I have not examined the specimens.

Louisiana: 4♂, Opelousas, May-June 15, 1897, (G. R. Pilate), [U.S.N.M.].

Texas: 1♂, Lufkin, June 6, (F. C. Bishopp), [U.S.N.M.].

Arizona: 1♂, [A.N.S.P.].

California: 2♂, Imperial Valley, May, (J. C. Bridwell); 2♂, June 1, 1912, (J. C. Bridwell; visiting glandular hairs of leaves of *Helianthus annuus*), [U.S.N.M.].

MEXICO: Baja California, [*teste Fox*]. Chilpancingo in Guerrero, 4600 ft. (H. H. Smith), [*teste* Cameron].

The specimens from Imperial Valley, California are smaller and have hyaline wings but inasmuch as the genitalia and sculpture compare very well with more eastern specimens I do not consider them specifically distinct.

MYZINE Latreille[18]

1803. *Myzine, Myzinum* Latreille, Nouv. Dict. d'Hist. Nat., xv, p. 326. [♀, ♂.]
1805. *Myzine* Latreille (in part), Hist. Nat. Crust. Ins., XIII, p. 269.
1805. *Elis* Fabricius (in part), Syst. Piez., p. 248. [♂.]
1807. *Plesia* Jurine, Nouv. Meth. class. Hymen., p. 150. [♀.]
1807. *Myzine* Illiger, Mag. f. Insektenk., VI, p. 194.
1815. *Myzina* Rafinesque, Anal. Nat., p. 124.
1887. *Myzine* Cresson, Trans. Am. Ent. Soc., XIV, Suppl. pp. 108, 268.
1897. *Myzine* Bingham, Fauna Brit. India Hym., I, pp. 67, 69.
1897. *Myzine* Dalla Torre (in part), Catal. Hym., VIII, pp. 120-130.
1897. *Plesia* Dalla Torre (in part), Catal. Hym., VIII, pp. 130-133.
1903. *Myzine* Ashmead, Can. Ent., XXXV, pp. 4-7.
1909. *Elis* Turner, Ann. & Mag. Nat. Hist., (8), IV, p. 165.
1911. *Elis* Rohwer, Proc. U. S. Nat. Mus., XL, p. 552.
1935. *Myzinum* Pate, Ent. News, XLVI, pp. 265-267.
1937. *Myzine* Krombein, Ann. Ent. Soc. Am., XXX, pp. 27, 29, 30.

GENOTYPE: *Tiphia maculata* Fabricius, 1793. (Monobasic.)

The involved synonymy of this genus has been due to several factors: first, the remarkable difference in appearance of the sexes which led early authors to place them in different genera; secondly, the supposition of early authors that the New World *Myzine* was congeneric with the Old World *Meria;* next, the oversight of bibliographers and authors in crediting Latreille with the original publication of *Myzine* in his Histoire Naturelle des Crustaces et Insectes, 1805 (1804?) rather than in the Nouveau Dictionnaire d'Histoire Naturelle, 1803: and lastly, the erroneous type designations of Ashmead and Bingham.

Fortunately Coquebert has given a good illustration of *Tiphia maculata* Fabr., the genotype of *Myzine* Latr., and without a doubt it is the North American species which has been considered the *Myzine interrupta* of Say by most authors.

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[18] Owing to the limitations of space it has not been possible to give a detailed treatment to the generic synonymy. However, the complete synonymy is stated under each species for that particular species.

♀. Head transverse; eyes large, touching the base of the mandibles, the inner margin gently concave and not angulate; mandibles broad and sickle-shaped with a groove near each edge on the basal two-thirds and a series of stiff hairs basally; antennae arising from beneath frontal lobes, apparently 11-jointed (the pedicel concealed in the recessed apex of the scape), the flagellar segments except the apical two or three broader than long; ocelli three in number; clypeus broad, the apical margin rounded on the median two-thirds; maxillary palpi 6-jointed and longer than the 4-jointed labial palpi.

Thorax longer than broad; pronotum transverse, not longer than the mesonotum, its posterior margin arcuately emarginate; propleura obliquely striated; mesonotum transverse and with well-developed notauli and parapsidal furrows; scutellum slightly longer than the mesonotum, its posterior margin convex; propodeum with its dorsal, posterior and lateral surfaces distinctly differentiated; mesopleura distinctly inflated; metapleura abruptly constricted.

Abdomen broad and 6-segmented; pygidium longitudinally striated and rounded apically.

Wings not quite reaching the apex of the abdomen; the marginal cell removed from the costal border for its entire length and rounded or obtuse apically; three submarginal cells, the second and third each receiving a recurrent nervure; cubitus in the hind wing arises beyond the transverse median nervure; discoidal nervure present.

Legs short and spinous, the middle and hind femora and tibiae enormously expanded for fossorial purposes; the outer surface of middle and hind femora closely beset with prickle-like spines; longer spur of hind tibia with a distinct tooth at the basal third; tarsal claws cleft, the inner tooth stouter and shorter.

Color black; head, thorax and abdomen usually maculated with yellow; clypeus, antennae, pygidium and legs at times rufous or marked with yellow.

♂. Head transverse; eyes large, touching the base of the mandibles, the inner margins deeply emarginate; mandibles slender with an inner tooth at the apical fourth; hair on mandibles not as strong as in female; antennae arising from beneath frontal lobes, apparently 12-jointed (the pedicel is concealed in the recessed apex of the scape), the flagellar segments longer than broad; ocelli three in number; clypeus emarginate medially on the apical edge; labrum bilobed and usually exserted; maxillary palpi 6-jointed and longer than the 4-jointed labial palpi.

Thorax longer than broad; pronotum transverse, arcuately emarginate posteriorly and with a low rounded ridge on the anterior border of the disk; mesonotum quadrate, longer than the pronotum or scutellum, with well-developed notauli and parapsidal furrows; scutellum about as long as the pronotum, its posterior margin convex; propodeum with the dorsal and posterior surfaces rounded into each other; mesopleura inflated; metapleura abruptly constricted.

Abdomen slender and 7-segmented; the last segment (pygidial area not differentiated) deeply emarginate apically for the reception of the recurved hypopygial aculeus.

Wings reaching almost to the apex of the abdomen; the marginal cell confluent anteriorly with the costal border and rounded apically; three submarginal cells, the second and third each receiving a recurrent nervure; cubitus in the hind wing arises before the transverse median nervure; discoidal nervure present.

Legs rather short and moderately spinous, the middle and hind femora and tibiae not expanded; middle and hind tibiae with several rows of spines on the outer surface; longer spur of hind tibia unarmed; tarsal claws cleft, the inner tooth slightly stouter and shorter.

Genitalia: ental surface of inner clasper with about fourteen ctenidia-like structures; aedeagus usually slender for most of its length and expanded apically into a bulbous portion.

Color, black; head, thorax, abdomen and legs maculated with yellow; legs and apical abdominal segments occasionally rufous.

Distribution.—This New World genus has a particularly wide distribution having been recorded from Canada, nearly every state in the Union and all the Central and South American countries with the exception of Chile.

Relationships of the North American Species.—During the progress of my studies I have had an opportunity of examining over seven thousand specimens of *Myzine* from North America. This large amount of material has convinced me that there are four species groups represented in North America which may be separated conveniently as follows:

Obscura Group—Females large, predominantly black with dark brown wings having violaceous reflections; males large, the yellow markings reduced in extent, the pygidium usually opaque and lacking a mesepisternal groove below the tegula. Includes the North American *obscura, magna* sp. nov., *berlyi*, and its two new subspecies *parksi* and *patei.*

Quinquecincta Group—Females large, yellow markings much more extended than in the above group; wings tawny in both sexes; males large and with more extensive yellow markings than in the *obscura group* and with a glabrous pygidium. Includes the North American *quinquecincta, namea, caroliniana* and its subspecies *collaris.*

Navajo Group—Females moderately large, the posterior surface of the propodeum with extremely coarse rugae which radiate outwardly from the apex; aedeagus of males greatly inflated apically, the ventral surface of the bulb expanded laterally and anteriorly into a very thin lamella. Contains the North American *navajo* sp. nov.

Maculata Group — Females smaller, wings ordinarily hyaline with an infumated costal margin; males small, with a glabrous pygidium and a transverse mesepisternal groove below the tegula. Contains the North American *maculata, confluens, spilonota, frontalis* and *dubiosa.*

Diagnostic Characters of the Species. — The large amount of material which I have had before me has also shown that there is a good deal of variation within a species both in the puncturation and in the extent of the markings.

The males are quite difficult to separate by external characters alone and it is often necessary to extract the genitalia to verify the determination.[14] The important external characters are the condition of the pygidium, whether glabrous or opaque and grooved or flat, the presence or absence of the mesepisternal groove below the tegula (this is absent occasionally in specimens which should have it) and the width of the yellow bands on the abdominal tergites. The size is also important as males of the *obscura* and *quinquecincta* groups are uniformly much longer than those of the other two groups. The important characters in the genitalia are in the shape and length of the various parts rather than in the spinosity.

The females are also subject to a good deal of variation in puncturation. The coloration is more constant except for *caroliniana* subsp. *collaris* and members of the *maculata* group. The important specific characters of the females are the puncturation of the head and thorax particularly of the pronotum and propodeum, the wing color and the general color pattern. The abdominal puncturation is not of the same importance as in some South American species.

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[14] I have found that the best method of extracting the genitalia is to relax the specimen for two days. The aculeus is then pushed down and if the tip of the genitalia is protruded it may be coaxed out with a fine forceps. If it does not protrude it is necessary to use a hook made from a minute nadel. The genitalia may be left hanging from the tip of the abdomen or may be mounted on a point or balsam slide.

Key to the Nearctic Species of Myzine

1. Antennae apparently 11-segmented; abdomen with six visible segments; females 2
   Antennae apparently 12-segmented; abdomen with seven visible segments; males 15
2. Lateral surfaces of propodeum smooth and without striae 3
   Lateral surfaces of propodeum longitudinally or obliquely striate 4
3. Pronotal disk with numerous minute punctures interspersed among the larger ones on practically the entire surface; declivous portion of pronotum with a yellow spot or band .... *namea* (Fabricius)
   Pronotal disk with only the larger punctures except for a few scattered minute ones anteriorly; declivous portion of pronotum without a yellow spot .... *caroliniana* subsp. *caroliniana* (Panzer)
4. Pronotum, mesonotum and scutellum very sparsely punctured; vertex practically impunctate behind the ocelli; large species, 18-23 mm. in length; from the Atlantic states ...... *berlyi* subsp. *patei* subsp. nov.
   Punctures on pronotum, mesonotum and scutellum much more numerous, or rarely attaining a length of 16 mm.; and not from the Atlantic states 5
5. Mesonotum and scutellum black; abdomen usually with lateral spots only on tergites two to four or five inclusive 6
   Either mesonotum or scutellum or both marked with yellow; at least some of the abdominal segments beyond the first banded with yellow 8
6. Posterior surface of propodeum smooth and without striae.
   berlyi subsp. *parksi* new subspecies
   Posterior surface of propodeum with transverse striae at least at the junction of that surface with the dorsal surface 7
7. Pronotal disk with a median, narrow longitudinal band of minute punctures which extend to the apex of the segment; first tergite banded with yellow, the second and third and usually the fourth spotted laterally with yellow .... *berlyi* subsp. *berlyi* (Brimley)
   Pronotal disk without such a band of minute punctures, which if present, is confined to the basal portion of the segment only; tergites one to four and occasionally five spotted laterally with yellow.
   obscura (Fabricius)
8. Entire posterior surface of propodeum covered with extremely coarse rugae which radiate out from the insertion of the abdominal muscle to the lateral surfaces .... *navajo* new species
   Posterior surface of propodeum smooth or with weaker, radiating striae 9
9. Posterior surface of propodeum nearly smooth to moderately striate; antennae light ferruginous; wings tawny yellow; pronotal disk with a lateral spot on anterior portion and a broad band on posterior

margin; ocellocular line usually twice as long as the postocellar line; size large, averaging 18-22 mm. in length ..*quinquecincta* (Fabricius)
With a different combination of characters 10

10. Posterior surface of propodeum entirely smooth; antennae dark brown, occasionally slightly reddish beneath; wings tawny yellow; ocellocular line usually twice as long as postocellar line; size large, averaging 18-22 mm. in length ....*caroliniana* subsp. *collaris* (Say)
Size smaller or posterior surface of propodeum not entirely smooth; ocellocular line less than twice as long as the postocellar line 11

11. Abdominal tergites two to five with both apical and basal bands, the basal bands on the fourth and fifth and the apical band on the second interrupted medianly; anterior and posterior margins of the pronotal disk with complete yellow bands; posterior surface of propodeum smooth except for some short minute striae immediately above the insertion of the abdominal muscle ......*confluens* Cresson
Without such a combination of characters; either abdominal tergites two to five entirely yellow, or a basal band only yellow, or the anterior margin of the pronotal disk with two yellow spots 12

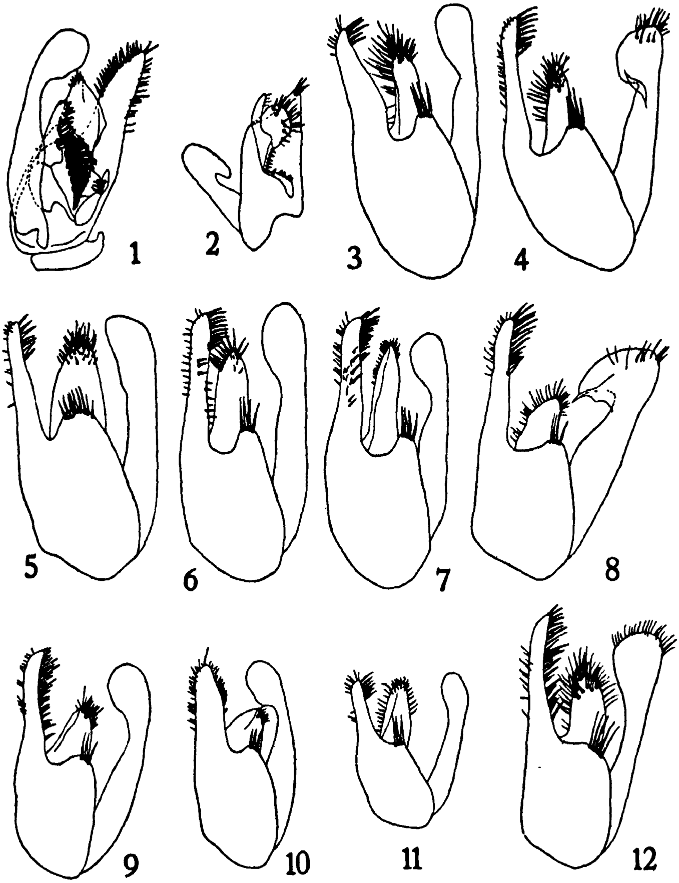
12. Many of the punctures on the pronotal disk confluent in longitudinal rows and with no interspersed minute punctures; propodeum usually with a central yellow spot at the junction of the dorsal and posterior surfaces; apices of the abdominal sternites fringed with extremely long glistening white hair ....*spilonota* (Cameron)
Pronotal punctures not confluent and in longitudinal rows, or else the disk is bipunctate 13

13. At least a portion of the pronotal disk beyond the anterior margin bipunctate; infumated costal margin of forewing very dark, the rest of the wing nearly hyaline ....*maculata* (Fabricius)
Pronotal disk not bipunctate beyond the anterior margin; forewing either entirely hyaline or uniformly infuscated, but the infumation is never so dark as in the preceding 14

14. Antennae black; wings nearly hyaline; yellow markings more extended; occurring in the southwestern states ....*frontalis* Cresson
Antennae ferruginous to dark brown; wings usually more or less infuscated; yellow markings less extended than in *frontalis;* occurring from the Alleghanies westward .... *dubiosa* Cresson

15. Pygidium with a longitudinal, impressed median groove 16
Pygidium flat or slightly concave, but without an impressed median groove 17

16. Wings tawny yellow; pygidium usually spotted with yellow; visible portion of inner clasper flat and rounded apically (fig. 6).
quinquecincta (Fabricius)
Wings hyaline, slightly infumated at the apices; pygidium black; visible portion of inner clasper distinctly three-sided in cross-section and narrowed gradually to a point apically (fig. 7).
caroliniana subsp. *caroliniana* (Panzer)



Male Genitalia. Text-fig. 1.—*Myzine dubiosa* Cresson. Fig. 2.—*Pterombus rufiventris* (Cresson). Fig. 3.—*Myzine obscura* (Fabricius). Fig. 4.—*Myzine berlyi* subsp. *parksi* n. subsp. Fig. 5.—*Myzine magna* n. sp. Fig. 6.—*Myzine quinquecincta* (Fabricius). Fig. 7.—*Myzine caroliniana* subsp. *caroliniana* (Panzer). Fig. 8.—*Myzine navajo* n. sp. Fig. 9.—*Myzine frontalis* Cresson. Fig. 10.—*Myzine dubiosa* Cresson. Fig. 11.—*Myzine maculata* (Fabricius). Fig. 12.—*Myzine spilonota* (Cameron).

Figures 1 and 2 are in the ental aspect, oriented so that the aedeagus is at the left, the dorsal lobe of the outer clasper at the right and the inner clasper superimposed on the latter. Figures 3 to 12 are in the ectal aspect, oriented so that the aedeagus is at the right, the visible portion of the inner clasper in the middle and the dorsal lobe of the outer clasper on the left. All figures drawn from balsam mounts by the author; 1 and 3 to 12 are X 17; 2 is X 13.

17. Pygidium opaque; mesepisternum usually without a transverse carina below the tegula set off by a groove posteriorly 18
Pygidium shining, usually highly polished; mesepisternum usually with such a groove below the tegula 20
18. Sinus of outer clasper rather narrow; dorsal edge of ventral lobe of outer clasper straight; dorsal lobe of outer clasper very broad (fig. 5); visible portion of inner clasper rather thickly spined at the apex ....*magna* new species
Sinus of outer clasper broader; dorsal edge of ventral lobe of outer clasper deeply incised ventrad at the sinus; dorsal lobe of outer clasper moderately broad; visible portion of inner clasper not thickly and coarsely spined at the apex 19
19. Ventral lobe of outer clasper rather broad; apical portion of inner clasper moderately haired on the edges (fig. 3) ..*obscura* (Fabricius)
Ventral lobe of outer clasper narrower; apical portion of inner clasper more densely haired on the edges (fig. 4).
berlyi subsp. *parksi* new subspecies
berlyi subsp. *patei* new subspecies
20. Dorsal edge of ventral lobe of outer clasper deeply incised ventrad at the sinus; visible portion of inner clasper flat; wings tawny; mesepisternum with a transverse groove beneath the tegula (fig. 4).
berlyi subsp. *berlyi* (Brimley)
Dorsal edge of ventral lobe of outer clasper not deeply incised ventral at the sinus, or if so, then the visible portion of the inner clasper is distinctly three-sided in cross section 21
21. Mesepisternum without a transverse carina set off by a groove posteriorly below the tegula 22
Mesepisternum with a transverse carina set off by a groove posteriorly below the tegula 23
22. Species from Indiana to South Dakota and south to New Mexico and Mississippi ....*caroliniana* subsp. *collaris* (Say)
Species from North Carolina south to Florida and west to Texas (see also couplet 16). ....*caroliniana* subsp. *caroliniana* (Panzer)
23. Visible portion of the inner clasper attaining the apex of the aedeagus or nearly so; well-developed sinus between the dorsal and ventral lobes of the outer clasper lacking (fig. 11) .....*maculata* (Fabricius)
Visible portion of the inner clasper not attaining the apex of the aedeagus; sinus between the dorsal and ventral lobes of the outer clasper usually well developed 24
24. Visible portion of inner clasper distinctly three-sided in cross section .25
Visible portion of inner clasper flat 26
25. Ventral lobe of outer clasper broad (fig. 10) ....*dubiosa* Cresson
Ventral lobe of outer clasper slender (fig. 9) ....*frontalis* Cresson
26. Bulbous extremity of aedeagus greatly inflated and with a lamella on its ventral surface (fig. 8) ....*navajo* new species
Bulbous extremity of aedeagus normal (fig. 12) ..*spilonota* (Cameron)

Myzine obscura (Fabricius) (Text-fig. 3.)

1805. *Tiphia obscura* Fabricius, Syst. Piez., p. 233. [♀.]
1807. *Plesia obscura* Jurine, Nouv. Meth., p. 152. [♀.]
1809. *Myzine obscura* Latreille, Gen Crust. et Ins., IV, p. 112. [♀.]
1838. *Plesia nigripes* Guérin, Rev. Zool., I, p. 57. [♀.] (New Synonymy.)
1845. *Plesia fuliginosa* Lepeletier, Hist. Nat. Ins., Hym., III, p. 574. [♂.]
1855. *Myzine fuliginosa* Smith, Cat. Hym. Br. Mus., III, p. 79.
1927. *Elis obscura* Brimley, Ent. News, XXXVIII, p. 237. [♀, ♂.]

Obscura is most closely related to *Plesia sexmaculata* Guérin from Mexico and Central America and it may be necessary eventually to place *sexmaculata* as a subspecies. *Obscura* is also closely related to *berlyi* (Brim.) and its subspecies *parksi* subsp. nov. and *patei* subsp. nov. The females of *obscura* may usually be separated from *berlyi* females by the absence of the narrow longitudinal band of minute punctures on the pronotal disk and by the abdominal coloration, and from *parksi* females by the transverse rugae at the junction of the dorsal and posterior surfaces of the propodeum. The males of *obscura* are separated from males of *berlyi* and its subspecies by the broader ventral lobe of the outer clasper; the opaque pygidium and hyaline wings also separate *obscura* males from subsp. *berlyi*.

♀. 13-20 mm. long. Entire surface of clypeus covered with large punctures and interspersed minute ones on the basal portion; front shining with large punctures; ocellocular line twice as long as postocellar line; vertex shining, the punctures sparser than on the front; pronotal disk with large punctures of second degree density; anterior third of mesonotum with minute punctures, the remaining portion with larger, sparser ones; scutellum with numerous large punctures and usually a median longitudinal groove; postscutellum with large punctures some of which are confluent; dorsal surface of propodeum minutely punctured laterally and with several large confluent punctures medianly and with several very strong transverse rugae at apex; posterior surface of propodeum with numerous transverse striae, those at the apex the weakest; mesepisternum shining with large, sometimes confluent punctures; lateral surface of propodeum with well developed longitudinal striae; abdomen shining, tergites one to five inclusive with numerous fine punctures.

Black; two spots on frontal lobes, inner margins of eyes narrowly, spot on antero-lateral corners of pronotal disk, band on postscutellum, spot on mesepisternum below tegula, lateral spots on tergites one to four or five inclusive, yellow; abdomen with violaceous reflections; wings dark brown; venation dark brown; hair whitish.

Occasionally the propodeum has a band on the lateral surfaces and another laterally on the dorsal surface, and the temples may have a short yellow band.

♂. 15-23 mm. long. Clypeus with large confluent punctures; front closely punctured, the vertex less so; pronotum, mesonotum, scutellum and postscutellum shining and with distinct separated punctures; dorsal and posterior surfaces of propodeum with large confluent punctures; mesepisternum sub-shining with numerous punctures; lateral surfaces of propodeum striato-punctate; first to sixth tergites inclusive with numerous minute punctures; pygidium opaque, flat and with several large punctures. Black; mandibles except apices, clypeus, inner orbits of eyes to emargination, frontal lobes, scape beneath, anterior (interrupted medianly and extending down on the propleura) and posterior margins of the pronotal disk, tegulae, minute lateral and larger median spots on mesonotum, spot on scutellum, band on postscutellum, lateral spots on propodeum (usually not emarginate anteriorly), large spot on mesepisternum below tegula and a smaller one above middle coxa, apical bands ½ mm. wide on tergites one to six inclusive (emarginate antero-laterally), lateral spots on sternites two to six inclusive, yellow; anterior surface of fore coxa, spots on middle and hind coxae, apical half of fore and middle femora, band above and below on hind femur, all tibiae outwardly (very narrowly on hind tibia), all tarsi except apical joint of hind tarsi, yellow; wings hyaline, the apices of the forewings slightly infumated; venation yellowish brown; hair white.

The following yellow markings may be absent: lateral spots on mesonotum, scutellum, spot on mesepisternum above middle coxa, lateral spots on sixth sternite and the hind tibia may be entirely black.

Type.— ♀ ; Carolina, (Bosc.).

I have not seen this type which is probably in the Muséum National d'Histoire Naturelle at Paris.

The type of *Plesia nigripes* Guérin, a male from " patrie inconnue ", is in Turin or Munich. The type of *Plesia fuliginosa* Lepeletier, a male from Pennsylvania, should be in the Muséum National d'Histoire Naturelle at Paris. I have seen neither of these types.

There is some doubt in my mind as to whether this species is really the *Tiphia obscura* of Fabricius since that author states there is a pair of yellow spots on the first abdominal segment only. Fabricius' specimen was from Carolina so he may have had a specimen of *berlyi* (Brimley) before him. All females of the type series of *berlyi* have spots on the first two segments only and I have seen no *obscura* females with less than four pairs of spots. However, pending an examination of Fabricius' type, I prefer to retain the name of *obscura* (Fabr.) for the species so identified by all other authors.

Plesia nigripes Guérin was described from a female from "patrie inconnue". I have placed this species in the synonymy of *obscura* (Fabr.) because the color patterns of the two species are identical particularly in the five elongate spots on each side of the first five abdominal segments.

Plesia fuliginosa Lepeletier was described from a male from Pennsylvania. This species is supposed to have hyaline wings with infuscated apices so it is obviously either *maculata* (Fabr.) or *obscura* (Fabr.). I have placed it under the synonymy of *obscura* because Lepeletier states that the hind tibiae are entirely black except for a yellow spot at the base. This is one of the few color characters which is reliable for the separation of males of *obscura* and *maculata* since the hind tibiae of *maculata* are entirely yellow or ferruginous outwardly.

Specimens examined: 200♀ and 202♂.

NEW YORK: 1♀, Ithaca, (Chittenden), [U.S.N.M.]. A doubtful record.

NEW JERSEY: 1♂, Da Costa, July 19, 1903, [A.N.S.P.]: 1♀, 3♂, Riverton, June 20-Sept. 8, 1921, (T. H. Frison), [I.N.H.S.].

PENNSYLVANIA: 1♂, [A.N.S.P.].

DELAWARE: 1♂, Aug., [A.N.S.P.].

MARYLAND: 3♀, 3♂; Hagerstown, Queen Anne's County, Plummer's Island, Prince George County, Riverdale, Chesapeake Beach; July 6-Aug. 15; [U.S.N.M., A.N.S.P., U.N.].

DISTRICT OF COLUMBIA: 10♀, Washington: 1♀, Potomac Gardens, Washington, Aug. 14, 1932, (Dwight Buchanan), [all U.S.N.M.].

VIRGINIA: 35♀, 46♂; Falls Church, Fort Humphreys, Norfolk, Nelson County, Vienna, Clifton, Alexandria; June 16-Sept. 16; [U.S.N.M., U.M., U.N.].

NORTH CAROLINA: 20♀, 32♂; Carrituck County, Tyrell County, Roanoke Island, Smokemont, Swannanoa, McCullers, Cherokee, Kittrell, Wilmington, Elizabeth City, Beaufort, Overhills, Ashville, Oteen, Raleigh, Black Mt., Valley of Black Mts.; late June-Oct. 10; [U.S.N.M., A.M.N.H., C.S.B.].

SOUTH CAROLINA: 2♀, Greensville, Aug. 26-Sept. 6, (H. K. Townes), [H.K.T.].

GEORGIA: 46♀, 31♂; Summerville, Spring Creek, Decatur County, Thomson's Mills, Thomasville, Clyde, Chesser's Island, Stone Mt., Kennesaw Mt., Dalton, Tallulah Falls, Yonah Mt., Rome, Helen, Atlanta, Fort Mt., Armuchee, Head River, Vidalia; June 30-Oct. 7, [A.N.S.P., C.U., U.S.N.M., P.W.F.].

FLORIDA: 1♂, 1♀, Tampa, [both U.S.N.M.].

ILLINOIS: 7♀, 4♂; De Soto, Alto Pass, Metropolis, Normal, Havana, Du Bois, Elizabethtown, Seymour; July 26-Sept. 5, [I.N.H.S.].

KENTUCKY: 1♀, East Cairo, Sept. 27, 1879, [I.N.H.S.].

ALABAMA: 1♂, Mobile, July 1909, (H. P. Löding), [U.S.N.M.].

MISSISSIPPI: 22♀, 24♂; Utica, Greenwood, Lucedale, Lumberton, Purvis, Columbia, Nelliston, Lafayette County, Iuka, Gibson, Shubuta, Agricultural College; June 3-Aug. 17, [U.S.N.M., C.U., M.S.A.C.].

LOUISIANA: 6♀, 3♂; Mound, New Orleans to Union, Morse, Lafayette; April 8-Sept. 16; [C.U., S.L.I.].

TEXAS: 13♀, 1♂; Fedor, Humble, Dayton, Dime Box, Jacksonville, Walker County, Brazos County, Trinity; May 31-Oct. 9; [A.N.S.P., C.U., M.S.A.C., T.A.M., U.S.N.M.].

OKLAHOMA: 1♀, Tishomingo, Sept. 4, 1906, (F. C. Bishopp), [U.S.N.M.].

MISSOURI: 11♀, 7♂; Cadet, Kansas City, Springfield; July 16-Aug. 8, [U.S.N.M., H.S.P.A., C.U.].

KANSAS: 11♀, 9♂; Baldwin, Cherokee County (888 ft. alt.), Labette County (899 ft. alt.), Bourbon County (800 ft. alt.), Allen County (962 ft. alt.), Douglas County (900 ft. alt.), Onaga; July 20-Aug. 9, [U.S.N.M., K.S.C., K.U.].

ARIZONA: 1♂, [A.N.S.P.]. Possibly a mis-labeled specimen.

No data: 6♀, 2♂, [U.S.N.M.].

Flower Records.—Asclepias incarnata, A. syriaca, A. verticillata, Xanthium spinosum, Pycnanthemum flexuosum, Gossypium sp., *Cicuta maculata, Eryngium yuccifolium, Symphoricarpos orbiculatis, Rudbeckia hirta.*

Myzine berlyi subsp. **berlyi** (Brimley)

1927. *Elis berlyi* Brimley, Ent. News, XXXVIII, p. 238. [♀.]

See remarks under *obscura* and *berlyi* subspecies *patei* for the discussion of this subspecies.

♀. 14-22 mm. long. Clypeus with minute punctures on the basal third and large interspersed ones on the entire surface; front opaque and moderately but strongly punctured; vertex opaque with a few scattered, smaller punctures; pronotal disk opaque with large scattered punctures laterally and a narrow band of minute punctures medianly, extending to the apex; mesonotum opaque with a few minute punctures basally and larger scattered ones apically; scutellum opaque with large scattered punctures and usually a median longitudinal groove; postscutellum opaque with several large punctures; dorsal surface of propodeum with several large pits medianly formed from confluent punctures and with strong transverse striae apically; posterior surface of propodeum opaque and with strong radiating striae; mesepisternum opaque with large scattered punctures of third degree density; lateral surfaces of propodeum shining with coarse oblique striae; abdominal tergites one to five inclusive with scattered minute punctures, the fourth and fifth with some interspersed large punctures apically.

Black; narrow band along the inner eye margins, band on postscutellum, a small spot on mesepisternum below the tegula, a transverse band incised posteriorly on the first abdominal tergite and lateral spots pointing inwardly on the second tergite, yellowish-white; wings dark brown with violaceous reflections, the costal margin of the forewing more strongly infuscated.

The above description applies to the type from South Carolina. Specimens from west of the Alleghanies differ structurally in having less prominent striae on the posterior surface of the propodeum and in color usually as follows: a small spot on the antero-lateral corners of the pronotal disk, a small spot laterally on the posterior surface of the propodeum, lateral spots on the second tergite united anteriorly by a narrow band and lateral spots on the third to fifth tergites inclusive, lemon yellow. Occasionally the abdominal segments are castaneous rather than the usual black.

♂ (hitherto unrecognized). 20-22 mm. long. Clypeus with large confluent punctures; front with large confluent punctures; the vertex not so heavily punctured; pronotum, mesonotum, scutellum and postscutellum shining and with large well-separated punctures; dorsal and posterior surfaces of propodeum shining with large punctures of first degree density; mesepisternum shining with large punctures and a transverse carina below the tegula set off posteriorly by a groove; lateral surface of propodeum minutely striato-punctate and shining; abdomen shining, tergites one to six inclusive with numerous fine punctures; pygidium opaque with several large punctures and some fine longitudinal striae basad of the emargination.

Black; mandibles except apices, clypeus, band along inner eye margins, frontal lobes, anterior (interrupted medianly and extending down on the propleura) and posterior margins of the pronotal disk, tegulae except apices which are translucent, small lateral and large median spots on the mesonotum, small spot on the scutellum, band on the postscutellum, lateral spot on posterior surface of propodeum, large spot on mesepisternum below tegula and a smaller one above the middle coxa, apical bands one-half mm. wide on abdominal tergites one to six inclusive (emarginate laterally) and elongate lateral spots on sternites two to six inclusive (narrowly separated medianly), yellow; spot on anterior surface of fore coxa, two spots on hind coxa, apical portion of fore and middle femora, narrow lines on inner and outer edges of hind femora, fore and middle tibiae externally, band on hind tibiae externally, all tarsi except apical joints of middle and hind tarsi and apical rings on the first three joints of middle and hind tarsi, yellow; wings tawny yellow; venation brown.

Type.—♀; Charleston, South Carolina, July 23, 1926, (J. A. Berly), [United States National Museum].

Three female paratypes bearing the same data are in the collections of the United States National Museum, C. S. Brimley and F. D. Sherman (?).

Specimens examined: 114♀ and 5♂.

South Carolina: 3♀, Charleston, July 23, 1926, (J. A. Berly; the type series), [U.S.N.M., C.S.B.].

Wisconsin: 2♂, Tower Hill, Aug. 20, 1900, (Wm. S. Marshall), [W.S.M.]

Illinois: 1♀, Meredosia, Aug. 22, 1917, (in sandpit), [I.N.H.S.]. 4♀, Havana, July 8-Sept. 25, (Hart, Adams, Brown; sand) [I.N.H.S.]. 1♂, Arenzville, Aug. 14, 1913, (bluff sand), [I.N.H.S.]. 5♀, Ill[inois], [A.M. N.H., I.N.H.S.].

Kentucky: 4♀, East Cairo, Sept. 27, 1879, [I.N.H.S.].

Mississippi: 1♀, Agricultural College, 1915, (G. D. Ratliff), [M.S.A.C.].

Texas: 1♀, Tex[as], [U.S.N.M.].

Kansas: 88♀, Riley County, July 23-Sept. 10, (Popenoe, G. A. Dean). 1♀, Onaga, Sept. 14, 1920, (Crevecoeur; on flowers). 1♀, Manhattan, Sept. 21, 1923, (E. Hartman); [all K.S.C.].

No data: 4♀, 2♂, [A.M.N.H.].

Myzine berlyi subsp. **parksi** new subspecies[15] (Text-fig. 4.)

The smooth posterior surface of the propodeum in the females usually distinguishes *parksi* from *obscura* and the lack of minute punctures on the pronotal disk separates them from *berlyi* females. The males are identical with those of subspecies *patei* and are separable by distribution only. The infumated wings of *berlyi* males should separate them from *parksi*. The genitalia of the three subspecies of *berlyi* are identical and the narrower finger-like lobe of the outer clasper distinguishes them from *obscura* males.

♀. 20 mm. long. Clypeus covered with large punctures and the basal portion with numerous interspersed, minute punctures; front opaque with large punctures mostly of first degree density; vertex and temples with large scattered punctures; pronotal disk opaque with large scattered punctures and a very few minute ones on the median line; mesonotum opaque with minute punctures on the basal third and large scattered ones on the apical two thirds; scutellum shining with several large punctures medianly and minute ones laterally; dorsal surface of propodeum medianly with several large pits formed from confluent punctures; posterior surface minutely punctured and without striae except at the extreme sides; mesepisternum opaque with large scattered punctures some of which are of second degree density; lateral surface of propodeum coarsely and obliquely striate; abdominal tergites with small scattered punctures.

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[15] This subspecies is named in honor of Mr. H. B. Parks who has collected the major portion of the type series.

Black; mandibles except apices, antennae beneath, apices of tegulae, tergites one to three laterally, and all tarsi, castaneous; a short narrow band along inner eye margin, a small spot on posterior corners of mesonotum, band on postscutellum, a small spot on the mesepisternum below the tegula, lateral spots on abdominal tergites one to four (those on the first nearly confluent), yellow; wings dark brown with violaceous reflections; the costal border of the forewings more deeply infuscated; venation black basally and testaceous apically.

Female paratypes show that the subspecies may vary in length from 17 to 22 mm. and may have the following color differences: lateral spots on clypeus, spots on frontal lobes confluent with band on inner margins of eyes, band on temples, spot on anterolateral corners of the pronotal disk and a band on the posterior margin, a small lateral spot on the posterior surface of the propodeum, fifth abdominal tergite with lateral spots, lateral spots on tergites three and four connected by a narrow band anteriorly and apices of all femora yellow; all tibiae ferruginous.

♂. 22 mm. long. Clypeus with large punctures of first degree density; front closely punctured; vertex less so; pronotum, mesonotum, scutellum and postscutellum shining and with separate, distinct punctures; dorsal and posterior surfaces of propodeum shining and more closely punctured; mesepisternum shining with large punctures of first degree density; lateral surfaces of propodeum indistinctly striato-punctate; abdominal tergites one to six inclusive with numerous minute punctures; pygidium shining with several large punctures over the entire surface and several minute longitudinal striae basad of the emargination.

Black; mandibles except apices, clypeus, inner margins of eyes to emargination, frontal lobes, a spot on scape beneath, a tiny spot on the apical margin of the vertex medianly, anterior (interrupted medianly and extending down on the propleura) and posterior margins of the pronotal disk, tegulae except apices which are translucent, small lateral and large median spots on mesonotum, large spot on scutellum, band on postscutellum, a small spot on each side of the dorsal surface of the propodeum, large spot on each side of posterior surface of propodeum (emarginate outwardly), large spot on mesepisternum below tegula (emarginate apically) and a smaller one above the middle coxa, apical bands on abdominal tergites one to five inclusive, the first deeply emarginate medianly on the anterior margin, the second to fifth emarginate laterally, elongate transverse bands on the sixth tergite narrowly separated medianly, lateral spots on sternites two to six inclusive, yellow; anterior surface of fore coxa, spots on middle and hind coxae, apical half of fore femur, outer surface of middle femur apically, median bands on inner and outer edges of hind femur, entire outer surface of fore and middle tibiae, band on outer surface of hind tibia, entire fore tarsi, and middle and hind tarsi except the distal two joints and apical rings on the first three joints, yellow; wings hyaline, the forewings tinged with dusky at the apices; venation testaceous.

Male paratypes show a variation in length from 18 to 21 mm. and the following color variations: median spot on apical margin of vertex lacking, lateral spots on dorsal surface of propodeum lacking, band on first tergite not deeply emarginate on anterior margin, spots on sixth tergite united medianly and lateral spots on sternites four and five united medianly.

Holotype.—♀; Bexar County, Texas, October 22, 1931, (H. B. Parks, on *Eupatorium compositifolium* Volt.), [Academy of Natural Sciences of Philadelphia, Type no. 4183].

Allotype.—♂; Bexar County, Texas, June 9, 1930, (H. B. Parks), [Academy of Natural Sciences of Philadelphia].

Paratypes.—1 ♀, Bexar County, Texas, July 12, 1931, (H. B. Parks; on *Petalostemum microphyllus* T. & G.), [H.B.P.]. 1 ♀, October 14, 1930, (H. B. Parks; on *Baccharis neglecta* Brit.), [H.B.P.]. 1 ♀, 10–12–3, 1931, (H. B. Parks), [H.B.P]. 1 ♂, October 1, 1932, (H. B. Parks), [H. B. P.]. 2 ♀, 5 ♂, no data but according to Parks they are from Bexar County, Texas, (H. B. Parks), [H. B. P.]. 1 ♂, no locality, June 20, 1930, (H. B. Parks), [H. B. P.]. 1 ♂, no data, (H. B. Parks; on *Xemensia encelioides*, [H.B.P.]. 3 ♀, Texas, [A.N.S.P.]. 1 ♀, Flio County, Texas, July 12, 1931, (G. P. Engelhardt), [A. M. N. H.]. 1 ♂, McDade, Texas, June 27, 1934, 10.35 A. M., (J. E. Gillaspy), [J.E.G.]. 1 ♂, Bastrop County, Texas, June 9, 1935, (J. E. Gillaspy; on *Gonopyrum americanum*); 1 ♂, Sept. 18, 1935, (J. E. Gillaspy; on *Eriogonum annum*); 1 ♂, Sept. 19, 1935, (J. E. Gillaspy; on *Monarda* sp.), [all J.E.G.]. 1 ♀, below New Orleans, Louisiana, July 29, 1932, (Moreland & Morris; on grass Mississippi River bank), [U.S.N.M.]. 3 ♀, Schriever, Louisiana, June 17, 1917, (J. C. Bradley), [C.U.]. 1 ♀, June 18, 1917, (on *Ampelopsis arborea*), [I.N.H.S.].

Myzine berlyi subsp. **patei** new subspecies[16]

1927. *Elis quinquecincta* Brimley (*nec* Fabricius), Ent. News, XXXVIII, p. 237. [♀.]

At first I thought the female of this subspecies was the one which Guérin described in 1838[17] as *vicina* and which has been determined as such by several other workers. However, Guérin states in his original description that "... la tête et corselet fortement ponctués. ..." whereas the female of this subspecies is the most sparsely punctured of all North American species. Moreover, he records *vicina* from "patrie inconnue". *Vicina* was described from a female in the de Romand collection so it may be a Mexican species as a good deal of de Romand's material came from that region. Dr. Berland writes that the type is not in the collection of the Muséum National d'Histoire Naturelle at Paris. Therefore, until Guérin's type is located and carefully studied, his species must remain a mystery.

The females of subspecies *patei* are separated from all other species by the large size and exceedingly sparse puncturation of the head and thorax. The males are identical with those of *parksi* and are separated by distribution only. I have seen only mid-western males of *berlyi* and they have infumated wings; whether the coastal forms of *beryli* when discovered will also have infumated wings is open to question. I have placed all the coastal males belonging to this complex in *patei* because *patei* females have been taken in the identical localities and no *berlyi* females have been taken on the coast other than the type series from Charleston, South Carolina.

♀. 17 mm. long. Clypeus shining, minutely punctate basally and with larger punctures on the apical two-thirds, the medio-apical area impunctate; front shining with large scattered punctures; vertex shining and practically impunctate; pronotal disk shining and with only several large scattered punctures and about twenty minute ones along the median line; mesonotum, scutellum and postscutellum shining and with very sparse punctures; dorsal surface of propodeum opaque except for a median shining area, laterally minutely punctate and apically with several large punctures and a few transverse striae; posterior surface of propodeum opaque with moderately strong, radiating striae; mesepisternum shining with large punctures mostly of third degree density; lateral surfaces of propodeum shining and with strong oblique striae; abdomen shining, tergites one to five inclusive with scattered minute punctures.

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[16] This species is named in honor of Mr. V. S. L. Pate in recognition of his invaluable advice and suggestions during the progress of my studies.

[17] Rev. Zool., I, p. 57, no. 4. [♀.]

Black; band on inner margins of eyes, frontal lobes, a spot on posterior margins of eyes, a spot on the antero-lateral corners of the pronotal disk and a narrow subapical band on the posterior margin (the margin itself translucent), tegulae, small lateral and a large median spot on the mesonotum, spot on the scutellum, band on postscutellum, an elongate lateral spot on the posterior surface of the propodeum, a large spot on mesepisternum below tegula and a smaller one above the middle coxa, a band on the first abdominal tergite narrowly emarginate posteriorly, lateral spots on the second and fifth tergites, basal bands on the third and fourth tergites broadly emarginate posteriorly and small lateral spots on the second and third sternites, light yellow; wings fuscous with a slight violaceous tinge, the costal margin of the forewing more strongly infuscated; venation dark brown.

Female paratypes show that the subspecies may vary from 15 to 23 mm. in length, that the dorsal and posterior surfaces of the propodeum may be almost devoid of striae, and that there may be the following color differences; a spot on the lateral corners of the clypeus, the posterior surface of the propodeum not spotted, small spot absent from mesepisternum above the middle coxa, abdominal tergites two to four or five spotted laterally, sternites unspotted or fourth sternite with lateral spots.

♂. 22 mm. long. Clypeus and front opaque and with large confluent punctures; vertex shining and not so closely punctured; pronotum, mesonotum, scutellum and postscutellum shining and with separate distinct punctures; propodeum subopaque, the dorsal surface more coarsely punctured than the posterior surface; mesepisternum shining with large punctures, many of first degree density and a transverse carina below the tegula set off posteriorly by a groove; lateral surfaces of propodeum rather strongly and obliquely striated; abdominal tergites one to six shining and with numerous minute punctures; pygidium subopaque with several large punctures.

Black; mandibles except apices, clypeus, inner margins of eyes to emargination, frontal lobes, small spot at apex of scape beneath, anterior (interrupted medianly and extending down on the propleura) and posterior margins of the pronotal disk, tegulae except apices, small lateral and large median spots on mesonotum, spot on scutellum, band on postscutellum, large spot emarginate outwardly on postero-lateral edges of propodeum, large spot on mesepisternum below tegula (emarginate posteriorly) and a smaller spot above middle coxa, apical bands on tergites one to six, the first bisinuate medianly on anterior margin, the second to sixth emarginate laterally, transverse lateral spots on sternites two to six, yellow; anterior surface of fore coxa, spots on middle and hind coxae, apices of fore and middle femora broadly, lines on anterior and posterior half of hind femur, outer surface of fore and middle tibiae, band on outer surface of hind tibia, fore tarsi entirely and middle and hind tarsi except the distal joints and apical rings on the first four joints, yellow; wings hyaline, the extreme apices of forewings infumated; venation testaceous.

Male paratypes show a variation in length from 17 to 18 mm. and the following color differences; a tiny median spot on vertex, a pair of small median spots on dorsal surface of propodeum, yellow.

Holotype.— ♀ ; Medford Lakes, New Jersey, July–August 1934 (V. S. L. Pate; on *Clethra alnifolia*), [Academy of Natural Sciences of Philadelphia, Type no. 4184].

Allotype.— ♂ ; Medford Lakes, New Jersey, August 2, 1935, (V. S. L. Pate; on *Clethra alnifolia*), [Academy of Natural Sciences of Philadelphia].

Paratypes.—1 ♀ , Lakehurst, New Jersey, Sept. 5, 1920, [A.M. N.H.]. 1 ♀ , Medford Lakes, New Jersey, Aug. 15, 1934 (V. S. L. Pate; on *Clethra alnifolia*), [V.S.L.P.]. 1 ♀ , July 25, 1935, (V. S. L. Pate; on *Clethra alnifolia*), [V.S.L.P.]. 1 ♂ , Menantico, New Jersey, July 27, 1923, (J. C. Bradley), [C.U.]. 2 ♀ , Southern Pines, North Carolina, [C.S.B.]. 2 ♀ , June 12, 1918, [A.M.N.H.]. 2 ♂ , June 24, 1909, [C.S.B.]. 1 ♀ , July 20, 1918, [A.M.N.H.]. 2 ♀ , July 31, 1918, (on *Spiraea*), [A.M.N.H.]. 1 ♀ , Aug. 3, 1918, (on *Spiraea*), [A.M.N.H.]. 1 ♀ , Aug. 5, 1918 (on *Spiraea*), [A.M.N.H.]. 1 ♀ , Aug, 5, 1918, [A.M.N.H.]. 1 ♀ , Aug. 5, 1918, (on false boneset), [U.S.N.M.]. 1 ♀ , Aug. 8, 1918, (on false boneset), [A.M.N.H.]. 1 ♀ , Aug. 15, 1902, (F. Sherman Jr.), [C.S.B.]. 2 ♀ , G[eorgi]a, [A.N.S.P.]. 1 ♀ , Spring Creek, Decatur County, Georgia, June 7–23, 1911, (J. C. Bradley), [C.U.]. 1 ♀ , DeFumiak Springs, Florida, Oct. 17–19, 1914, [A.M.N.H.].

Myzine magna new species (Text-fig. 5.)

It is quite possible that *magna* may prove to be the male of *namea* (Fabr.) which is known from the female only. Both species are quite uncommon and have overlapping distributions. Also, they are the only large eastern species of which but one sex of each is known.

The broad dorsal lobe of the outer clasper of the genitalia separates *magna* males from other North American species.

♂. 20 mm. long. Clypeus with large punctures of first degree density; front closely punctured; the vertex less densely punctured; pronotum, mesonotum, scutellum and postscutellum shining and with large well-separated punctures; dorsal surface of propodeum opaque and with large punctures of the first degree density; posterior surface opaque and closely striato-punctate; mesepisternum shining with large well-separated punctures and without a transverse carina below the tegula; lateral surfaces of propodeum shining with minute well-separated punctures; abdominal tergites one to six shining and with numerous minute well-separated punctures; pygidium opaque, slightly concave in cross-section, the surface with several large punctures and a few minute striae cephalad of the emargination.

Black; mandibles except apices, clypeus, band on inner margins of eyes to emargination, frontal lobes, scape beneath, bands on anterior (slightly emarginate medianly and extending down on the propleura) and posterior margins of the pronotal disk, tegulae except apices which are testaceous, large median spot on mesonotum, spot on scutellum, band on postscutellum, lateral spot on posterior surface of propodeum emarginate antero-laterally, large spot on mesepisternum below tegula and a smaller spot above the middle coxa, apical bands ½ mm. wide on abdominal tergites one to six inclusive, that of the first deeply emarginate medianly on the anterior margin, the remainder slightly narrowed medianly on the anterior margin, apical bands on sternites two to six inclusive, those on the second, fifth and sixth interrupted medianly, yellow; anterior surface of fore coxa, spots on middle and hind coxae, the apical portion of all femora broadly, all the tibiae externally, and all the tarsi except the apical joints of the middle and hind pairs, yellow; wings hyaline, the apices of the forewings slightly infumated; venation testaceous.

♀. Unknown.

Holotype.—♂; Georgia, [Academy of Natural Sciences of Philadelphia, Type no. 4185].

Paratypes.—1 ♂, Yemassee, South Carolina, Sept. 30, 1926, (J. T. Rogers), [U.S.N.M.]. 1 ♂, G[eorgi]a, [A.N.S.P.]. 1 ♂, Vidalia, Georgia, Aug. 11, 1937, (P. W. Fattig), [P.W.F.]. 1 ♂, Bainbridge, Georgia, Sept. 3–7, 1910, (J. C. Bradley), [C.U.]. 3 ♂, Gainesville, Florida, Sept. 26–Oct. 2, 1914, [A. M. N. H.]. 1 ♂, Auburn, Alabama, Sept. 25, 1896, (C. F. Baker; on *Solidago*), [U.S.N.M.]. 1 ♂, Guadalajara, Jalisco, Mexico, Aug. 22, (McClendon), [A.N.S.P.]. 1 ♂, Tuxpan, Jalisco, Mexico, Sept. 3, (McClendon), [A.N.S.P.].

Male paratypes differ structurally from the holotype as follows: two specimens show a tendency toward the development of a transverse carina and posterior groove on the mesepisternum below the tegula and several have the lateral surfaces of the propodeum indistinctly striato-punctate. The color variations are as follows: anterior band on pronotal disk interrupted medianly, a small spot on the postero-lateral corners of the mesonotum, and all bands on the sternites interrupted medianly. The length of the paratypes varies from 18 to 24 mm.

Myzine namea (Fabricius)

1805. *Tiphia namea* Fabricius, Syst. Piez., p. 233, no. 9. [♀.]
1920. *Elis propodealis* Rohwer, Proc. Ent. Soc. Wash., xxii, pp. 56-7. [♀.]
(New synonymy.)

This species may turn out to be the female of *magna* here described as I have noted under the discussion of that species.

♀. 18-24 mm. long. Clypeus with large punctures on the entire surface and some smaller ones basally; front shining with large, sometimes confluent punctures, bipunctate along the inner eye margins; ocellocular line about one and a third times as long as the postocellar line; vertex shining with large punctures of first degree density in some places; temples with smaller and fewer punctures; pronotal disk and mesonotum bipunctate; scutellum with large punctures medianly and smaller ones laterally; dorsal and posterior surfaces of propodeum opaque, the dorsal surface medianly with a few large, shallow punctures, the posterior surface with one or two transverse striae near the base; mesepisternum shining with large distinct punctures; sides of propodeum shining and without striae; abdomen shining, tergites one to five inclusive with numerous minute punctures.

Black; mandibles except apices, tibiae and tarsi, yellow ferruginous; apical portion of clypeus, inner eye margins narrowly, a spot on the frontal lobes, a spot or band on the temples dorsally, neck, spot on antero-lateral corners of the pronotal disk and a narrow band on the posterior margin, tegulae, a median spot on mesonotum, band on scutellum and postscutellum, large spot on mesepisternum below tegula and a smaller one above middle coxa, spot on lateral surface of propodeum, lateral spot on posterior surface of propodeum and at times a smaller median one, a broad, narrowly interrupted band on the first tergite, lateral spots on second tergite, band on anterior margin (emarginate posteriorly) of tergites three to five inclusive, lateral spots on second to fourth sternites inclusive, and the pygidium basally in some, yellow; a pair of spots on posterior coxa and apices of all femora narrowly, yellow; wings yellowish tawny, the costal margin of the forewing more infumated; venation brown.

♂. Unknown.

Type.—♀; Carolina, (Bosc.).

I have not seen the type of this species which is probably in the collection of the Muséum National d'Histoire Naturelle at Paris.

The holotype of *Elis propodealis* Rohwer, a female from Inverness, Florida, (Robertson), is in the United States National Museum as well as the one paratype from Virginia Beach, Virginia, August 31, 1903, (E. S. G. Titus).

Dr. J. C. Bradley was kind enough to compare a female of *caroliniana* (Panz.) with the probable type of *Tiphia namea* Fabr. in the Bosc. collection in the Muséum National d'Histoire Naturelle at Paris. He found that the two specimens agreed in having the lateral and posterior surfaces of the propodeum smooth and differed in that *namea* had denser puncturation on the vertex and the neck yellow. It has been my experience that these latter two characters are very reliable for the separation of *namea* and *caroliniana.* Unfortunately Dr. Bradley made no notes on the puncturation of the pronotal disk which is entirely different in the two species. I have examined the type and paratype of *propodealis* (Rohwer) in the U. S. National Museum and it is my opinion that they must belong to the same species which Dr. Bradley examined in Paris.

The specimen seen by Dr. Bradley is the probable type of *namea* since Fabricius described the species from material in the Bosc collection. Inasmuch as most of Bosc's collecting was done in the vicinity of Charleston, South Carolina, (Fabricius says "habitat in Carolina") this state should be included in the distribution given below.

The frequent references to *namea* in the literature undoubtedly refer to *quinquecincta* (Fabr.) as the color pattern is the same and the latter species is much more common.

Specimens examined: 7♀.

VIRGINIA: 1♀, Virginia Beach, Aug. 31, 1903, (E. S. G. Titus; paratype of *propodealis*), [U.S.N.M.]: 1♀, Oct 6 [U.S.N.M.].

NORTH CAROLINA: 1♀, Southern Pines, Sept. 26, 1923, (T. B. Mitchell). 1♀, Aberdeen, Oct., [all C.S.B.].

FLORIDA: 1♀, Inverness, (Robertson; holotype of *propodealis*), [U.S.N.M.].

ALABAMA: 1♀, Mobile, [A.M.N.H.].

TEXAS: 1♀, Dayton, Sept. 1918, (G. E. Riley), [M.S.A.C.].

Myzine caroliniana subsp. **caroliniana** (Panzer) (Text-fig. 7.)

1806. *Tiphia caroliniana* Panzer, Krit. Revis. Ins. Deutsch., II, i-ii, pl. 1, figs. a-c. [♀.]
1811. *Myzine flavipes* Olivier, Encycl. Meth., VIII, p. 136, no. 4. [♀.]
1887. *Myzine caroliniana* Cresson, Trans. Am. Ent. Soc., XIV, Supplem., p. 268.
1927. *Elis caroliniana* Brimley, Ent. News, XXXVIII, p. 237. [♀, ♂.]

The females are quite constant in coloration although there is sometimes a small yellow spot on the antero-lateral corners of the pronotal disk. The females of this subspecies are ordinarily quite easily separated from those of subspecies *collaris* (Say) by the smooth lateral surfaces of the propodeum. I have seen only three females from Texas which could be assigned to either subspecies.

The males also are not subject to a great deal of color variation. Occasionally the spots on the sternites are united by narrow bands or the spots on the propodeum are reduced to narrow bands. The groove or concavity on the pygidium usually separates males of this subspecies from those of subspecies *collaris*. In doubtful cases the locality or female characters will decide in which subspecies a male should be placed.

♀. 15-22 mm. long. Entire surface of clypeus with large punctures and numerous minute ones on the basal portion; front shining with large punctures; ocellocular line about one and a third times as long as the postocellar line; vertex shining, the punctures smaller and sparser than on the front; pronotal disk with large well-separated punctures and a patch of minute punctures on the anterior margin in the middle; mesonotum sparsely but coarsely punctured; scutellum more heavily puctured; dorsal and posterior surfaces of propodeum opaque with extremely minute punctures and no striae; mesepisternum shining with large distinct puntures; sides of propodeum shining and smooth; abdomen shining, the tergites with scattered minute punctures.

Black; mandibles except apices, apical margin of clypeus, hind tibia and all tarsi, reddish yellow; spot on clypeus above base of mandibles, inner eye margins narrowly, spot on frontal lobes, band on temples, posterior margin of pronotum, tegulae, band on postscutellum, small spot on mesepisternum below tegula, two U-shaped marks on first tergite of abdomen, lateral spots on second, anterior margin of third and fourth (emarginate posteriorly), lateral spots on fifth tergite, lateral spots on second and third sternites, yellow; apices of all femora outwardly and fore and middle tibiae entirely, yellow; scape ferruginous below and yellow above; wings dusky, the anterior portion of the forewing more strongly infumated;

venation dark brown; propodeum with whitish bloom from numerous appressed hairs.

♂. 12-22 mm. long. Clypeus with large confluent punctures; front closely punctured, the vertex less so; pronotum, mesonotum and scutellum with separate distinct punctures; dorsal and posterior surfaces of propodeum densely punctured; first to fifth tergites shining and with numerous minute punctures, the sixth less closely punctured; pygidium shining, shallowly grooved to gently concave and with several large punctures.

Black; mandibles except apices, clypeus, inner margins of eye to emargination, two spots on frontal lobes, scape beneath, anterior (interrupted medianly and extending down on the propleura) and posterior margins of pronotal disk, tegulae, small lateral and large median spots on mesonotum, spot on scutellum, band on postscutellum, lateral spots on propodeum slightly emarginate anteriorly, large spot on mesepisternum below tegula and a smaller one above middle coxa, apical bands on tergites one to six inclusive (slightly emarginate medianly and laterally), lateral spots on sternites two to six inclusive, yellow; anterior surface of fore coxa and spots on four posterior coxae, apical half of all femora, all tibiae except internally, all tarsi except apical joints of the middle and hind pairs, yellow; wings hyaline with dusky apices; venation dark brown.

Type.—♀; Carolina, (Bosc).

I have not seen the type of *Tiphia caroliniana* Panzer which should be in the Zoological Museum in Berlin.

The type of *Myzine flavipes* Olivier a female from Carolina, (Bosc), is probably in the Muséum National d'Histoire Naturelle at Paris. *Flavipes* is undoubtedly a synonym of *caroliniana* since Olivier's description of the coloration is practically identical with that of *caroliniana* and his specimen also came from Carolina, (coll. Bosc). It is of interest to note that Panzer's specimen also came from Bosc who had determined it as *namea*, (Fabr.).

Specimens examined: 87♀ and 126♂.

VIRGINIA: 1♂; Cape Henry; Sept. 9, 1924; [U.S.N.M.].

NORTH CAROLINA: 12♀, 10♂; Tyrell County, Carrituck County, Jekyl Island, Southern Pines, Tarboro, Dixon, Willard, Raleigh; June 6-Oct.; [U.S.N.M., A.M.N.H., C.S.B.].

SOUTH CAROLINA: 2♀, 9♂; McClellanville, Myrtle Beach, Pine Island, Murrell's Inlet; June 15-July 1; [U.S.N.M., H.K.T., K.V.K.].

GEORGIA: 24♀, 43♂; Kennesaw Mt., Stone Mt., Tifton, Billy's Island (Okefenokee Swamp), Unadilla, Chester, Oglethorpe, Albany, Toccoa, Brunswick, Butler's Ferry (Decatur Co.), Waycross, Vidalia, Rockmart, Armuchee; June 2-Sept. 10; [C.U., A.M.N.H., A.N.S.P., U.S.N.M., P.W.F.].

FLORIDA: 37 ♀, 42 ♂; Blountstown, 10 miles E[ast] of Everglades, Naples, Capron, Canal Point, Wewahitchka, Fort Myers, Titusville, Goulds, Fumiak, South Miami, Enterprise, Orange County, LaBelle, Marco, Gainesville, Punta Gorda; April 17-Nov. 16; [C.U., U.S.N.M., A.M.N.H.].

ALABAMA: 3 ♀, 2 ♂; Altmore, Mobile; June 30-Aug. 10; [U.S.N.M., C.U.].

MISSISSIPPI: 7 ♀, 11 ♂; Bayspring, Hattiesburg, Wortal, Shubuta, Agricultural College, Lucedale, Lumberton; May 13-Oct. 2; [M.S.A.C.].

LOUISIANA: 2 ♂; Johnson's Bayou, Crowley, June 15-Aug. 24, [U.S.N.M.].

TEXAS: 1 ♀, 1 ♂; Galveston, June 16-Aug.; [U.S.N.M., M.S.A.C.].

No data: 2 ♀, 2 ♂; [S.L.I., A.M.N.H.].

Flower Records.—*Spiraea, Cicuta curtissii*, Satsuma orange.

Myzine caroliniana subsp. **collaris** (Say)

1837. *Meria collaris* Say, Boston Journ. Nat. Hist., I, pp. 362-3, no. 3. [♀.]

1893. *Myzine thoracica* Fox (nec Guérin), Can. Ent., XXXV, p. 113. [♀.] (New synoymy.)

1897. *Myzine illinoisensis* Dalla Torre, Cat. Hym., VIII, p. 124. (nom. nov. for *thoracica* Fox).

1914. *Elis atriventris* Gahan, Proc. U. S. Nat. Mus., XL, pp. 431-2. [♀, ♂.] (New synonymy.)

I have placed *collaris* (Say) as a subspecies of *caroliniana* (Panz.) since the male genitalia are identical. *Collaris* is the Great Plains subspecies and *caroliniana* the Atlantic Coastal form and the ranges of the two overlap in the Gulf States.

The females of *collaris* at times resemble *quinquecincta* (Fabr.) very closely but the ferruginous antennae of the latter species will separate the two. The males of these two species are usually easily separated by the flat pygidium of *collaris*.

♀. 14-22 mm. long. Entire surface of clypeus with large punctures and the basal two-thirds with interspersed minute punctures; front shining with large punctures of the first degree density; ocellocular line about twice as long as postocellar line; vertex with coarse punctures of first degree density laterally; pronotal disk with large, well-separated punctures laterally and a patch of minute ones medianly reaching two-thirds the distance to the apical margin; mesonotum with some minute punctures anteriorly and large, well-separated ones posteriorly; scutellum with large punctures of first degree density and a median longitudinal, impressed groove; dorsal and posterior surfaces of propodeum with numerous minute punctures and no striae; mesepisternum shining with large punctures of first degree density anteriorly; lateral surface of propodeum with oblique striae; abdominal tergites one to four inclusive with numerous minute punctures, the fifth bipunctate.

Black; mandibles except apices, scape apically, hind tibia and all tarsi, ferruginous; lateral corners of clypeus, spots on frontal lobes confluent with narrow bands on inner eye margins, band on temples extending across the vertex, spot on antero-lateral corners of pronotal disk and a band on the posterior margin, tegulae, small lateral and large median spot on mesonotum, spot on scutellum, band on postscutellum, band on lateral edge of dorsal surface of propodeum extending down on the posterior surface, large spot on mesepisternum below tegula, large spots on first tergite narrowly separated medianly, lateral spots on tergites two to five, those on the third and fourth connected anteriorly by a narrow band, yellow; apices of fore and middle femora and fore and middle tarsi entirely, yellow; wings yellowish tawny, darker on anterior half of forewing; venation testaceous.

The females are very variable in the extent of the yellow markings. The above description refers to the ones having the least yellow. The following notes refer to those having the greatest amount of yellow: *yellow*—the entire head except for area surrounding ocelli and a spot on lower portion of outer eye margin, entire pronotal disk, entire mesonotum except narrow anterior margin and the impressed furrows, scutellum, entire propodeum, practically the entire mesepisternum, abdominal tergites one to five except for narrow apical margins, lateral spots on abdominal sternites two to six inclusive, spots on fore and hind coxae and apical third of all femora outwardly.

♂. 13-22 mm. long. Clypeus with large punctures of first degree density; front closely punctured, the vertex less closely; pronotum, mesonotum, scutellum and postscutellum shining with separate distinct punctures; dorsal and posterior surfaces of propodeum shining and with large, sometimes confluent punctures; mesepisternum shining with large separate punctures; abdominal tergites one to six with numerous minute punctures; pygidium flat to slightly concave, with or without longitudinal striae in addition to several large punctures.

Black; mandibles except apices, clypeus, inner margins of eyes to emargination, frontal lobes, scape beneath, anterior (interrupted medianly and extending down on the propleura) and posterior margins of the pronotal disk, tegulae, small lateral and large median spots on mesonotum, spot on scutellum, band on postscutellum, large mark laterally on posterior surface of propodeum emarginate anteriorly, large spot on mesepisternum below tegula and a smaller one above middle coxa, apical bands ½ to 1 mm. wide on tergites one to six inclusive (emarginate medianly on anterior margin) and lateral spots on pygidium, lateral spots on sternites two to six inclusive, yellow; anterior surface of fore coxa, spots on middle and hind coxae, apical third of fore and middle femora, apical portion of external surface of hind femur, all tibiae outwardly, all tarsi except the apical joints of the middle and hind tarsi, yellow; wings hyaline (occasionally suffused with yellow) with dusky apices; venation testaceous.

Type.—♀; Indiana.

The type of *Meria collaris* Say is probably no longer in existence.

The type of *Myzine thoracica* Fox a female from Southern Illinois (Robertson) is in the Academy of Natural Sciences of Philadelphia, Type no. 10393. The holotype of *Elis atriventris* Gahan a female from Elkpoint, South Dakota, July 1913 (C. N. Ainslie) is in the United States National Museum as well as the allotype male (same data) and the one paratype female (same data).

M. collaris (Say) was described from a female from Indiana. Say states that his species "... may be distinguished by the sericeous appearance of the metathorax and the absolute destitution of rugae on that part ..." In Say's Glossary the metathorax is defined as that portion of the thorax which we call the dorsal and posterior surfaces of the propodeum, but does not include the lateral surfaces of that segment. The specimens which I have assigned to *collaris* belong to the only species from the middle West having no striations on the posterior surface of the propodeum and the color characters assigned by Say to his species. I have had the opportunity of studying the types of *atriventris* (Gahan) and *thoracica* Fox, and find that they are unquestionably the same species. Furthermore, they possess the structural and color characters of *collaris* so I have placed them as synonyms of the latter species.

Specimens examined: 162♀ and 173♂.

OHIO: 1♀, Marietta, Aug. 21-24, 1927, [O.S.U.].

ILLINOIS: 4♀, 25♂; Danville, Meredosia (sandy area), Havana, Metropolis, Elizabethtown, Castle Rock (Grand Detour), Oakwood, Homer Park, Champaign, Savanna; June 21-Sept. 3; [A.N.S.P., I.N.H.S.].

INDIANA: 16♀, 23♂, Borden, Lafayette, July 4-Aug. 20, [U.S.N.M., C.U.].

MISSISSIPPI: 1♀, Greenwood, [U.S.N.M.].

LOUISIANA: 1♀, Palmetto, June 11, [M.S.A.C.].

TEXAS: 17♀, 35♂; Wilson County, Kingsville, San Diego, Segruin, Minerale, Brazos County, Austin, Circleville, Eastland County, Rock Island, 18 miles E[ast] of Miles, Victoria, Rosser, Clarendon, College Station, Galveston, Bexar County, Bastrop County, Williamson County; May 3-Sept. 20; [T.A.M., A.N.S.P., J.E.G., U.M., K.U., K.S.C., U.S.N.M., H.B.P.].

Missouri: 1♀, Atherton, July, [H.S.P.A.].

Kansas: 91♀, 35♂; Dickenson County, Allen County (962 ft.), Barber County (1468 ft.), Cheyenne County (888 ft.), Douglas Co. (900 ft.), Meade County, Wallace, Riley County; July 15-Aug. 17; [K.U., K.S.C.].

Iowa: 3♀, 11♂; Sioux City, Ames, July 1-Aug. 10, [U.S.N.M., A.N.S.P., H.A.S.].

Nebraska: 13♀, 17♂; Omaha, (Douglas Co.), South Sioux City (Dakota Co.), Maskell (Dixon Co.), West Point (Cuming Co.), Lincoln (Lancaster Co.), Niobrara (Knox Co.); July 10-Aug. 12; [U.N.].

Minnesota: 11♀, 28♂; Ramsey County, dunes near Jordan, (Scott Co.), Jordan, Lake City, Fort Snelling, LeSeuer Co., St. Cloud, Fridley sand dunes (Anoka Co.), Rice Creek (Anoka Co.); July 5-Aug. 27; [U.M.].

South Dakota: 5♀, 1♂; Volin, Elkpoint; June-Aug. 26; [H.C.S., U.S.N.M.].

New Mexico: 1♀, Magdalena Mts., Aug., [K.U.].

No data: 1♀, 1♂, [K.S.C., H.B.P.].

Flower Records.—Centaurea americana, Eupatorium sp., *Hymenopappus carolinensis, Parthenium Hysterophorus, Verbesina virginica, Monarda citriodora, Pycnanthemum flexuosum, Medicago sativa, Melilotus alba, Petalostemum candidum, Rosa pratincola, Cicuta maculata, Eryngium Leavenworthii, Eryngium yuccifolium, Vitex negundo, Cissus incisa, Ampelopsis arborea.*

Myzine quinquecincta (Fabricius) (Text-fig. 6.)

1775. *Tiphia quinquecincta* Fabricius, Syst. Ent., p. 353, no. 2. [♀.]
1775. *Scolia sexcincta* Fabricius, Syst. Ent., p. 356, no. 9. [♂.]
1789. *Sphex quinquecincta* Villers, C. Linaei Ent., iii, p. 239, no. 48. [♀.]
1791. *Sphex sexcincta* Christ, Naturg. d. Ins., p. 268. [♂.]
1805. *Elis sexcincta* Fabricius, Syst. Piez., p. 248, no. 1. [♂.]
1807. *Sapyga sexcincta* Jurine, Nouv. Meth., p. 152. [♂.]
1823. *Sapyga subulata* Say, West. Quart. Rep., ii, pp. 75-6. [♂.] New synonymy.)
1835. *Myzine subulatus* Say, Boston Journ. Nat. Hist., i, p. 301. [♂.]
1837. *Myzine sexcincta* Guérin, Dict. pitt. hist. nat., v, pp. 580-1. [♂.]
1837. *Myzine proxima* Guérin, Dict. pitt. hist. nat., p. 581. [♂.] (New synonymy.)
1897. *Elis sexcincta* Bingham, Fauna Brit. India, Hym., i, p. 89.
1909. *Plesia quinquecincta* Turner, Ann. & Mag. Nat. Hist., (8), iii, p. 485. [♀, ♂.]
1911. *Elis sexcincta* Rohwer, Proc. U.S. Nat. Mus., xl, p. 552.

1927. *Elis floridanus* Brimley (*nec* Rohwer), Ent. News, XXXVIII, p. 237. [♀.]

1927. *Elis atriventris* Brimley (*nec* Gahan), Ent. News, XXXVIII, p. 237. [♂.]

This species is the commonest one in most parts of its range except the extreme southeastern and western states and once recognized cannot be confused easily with other species. The tawny wings of both sexes, the light ferruginous antennae of the females and the grooved pygidium with lateral yellow spots of the males distinguish most specimens at a glance.

♀. 12-24 mm. long (18-22 mm. av.). Surface of clypeus shining with large well-separated punctures and a few minute ones basally; front shining with large, close punctures; vertex shining and more sparsely punctured; pronotal disk shining with large well-separated punctures and occasionally several minute ones on the anterior margin medianly; mesonotum and scutellum shining and moderately punctured; postscutellum shining with a few large punctures medianly and numerous minute ones laterally; dorsal surface of propodeum opaque with several large, confluent punctures medianly and numerous minute ones laterally and occasionally several weak transverse striae apically; posterior surface opaque and entirely smooth to weakly striate; mesepisternum shining with large well-separated punctures; lateral surfaces of propodeum with strong oblique rugae; abdominal tergites one to five inclusive shining with minute, separated punctures.

Black; mandibles except apices, clypeus entirely or in part, antennae entirely, hind coxa in part, all trochanters, basal portion of all femora, hind tibia and all tarsi, ferruginous to yellow ferruginous; clypeus in part, scape beneath, spot on frontal lobes confluent with broad band along inner eye margins, elongate spot behind eyes, occasional spot on vertex behind ocelli, spot on antero-lateral corners and band on posterior margin of the pronotal disk, tegulae except apices which are testaceous, small lateral and large median spots on mesonotum, spot on scutellum, band on postscutellum, band laterally on posterior surface of propodeum, large spot on mesepisternum below tegula, large confluent spots on first abdominal tergite, lateral spots on second, basal band on third to fifth inclusive emarginate posteriorly, lateral spots on abdominal sternites two and three and occasionally four and five also, yellow; hind coxa in part, portions of all femora and fore tibia outwardly, yellow; (several specimens from New Mexico and California have broad entire yellow bands on tergites one to five inclusive); wings yellowish tawny, margins of forewings more infumated; venation testaceous.

♂. 13-24 mm. long (18-22 mm. av.). Clypeus with large confluent punctures; front shining with large close punctures; vertex shining and less closely punctured; pronotum, mesonotum, scutellum and postscutellum shining with large well-separated punctures, dorsal surface of propodeum shining with large close punctures; posterior surface with close, finer punctures; mesepisternum shining with large well-separated punctures; lateral surfaces of propodeum shining and indistinctly striato-punctate normally; abdominal tergites shining, one to six inclusive with numerous minute punctures; pygidium shining and deeply grooved longitudinally, the surface with several large punctures.

Black; mandibles except apices, clypeus, frontal lobes, spot beneath at apex of scape, band on inner eye margins to emargination, occasionally a spot on vertex behind ocelli and one on temples above eyes, anterior (interrupted medianly and extending down on the propleura) and posterior margins of the pronotal disk, tegulae except apices which are testaceous, small lateral and a large median spot on mesonotum, spot on scutellum, band on postscutellum, lateral spot on posterior surface of propodeum emarginate antero-laterally, large spot on mesepisternum below tegulae and a smaller one above middle coxa, apical bands on tergites one to six inclusive, the first emarginate medianly and the fifth and sixth laterally, pygidium usually spotted or banded, lateral spots on sternites two to six inclusive, yellow; anterior surface of fore coxa, spots on hind coxa, apices of all femora, all tibiae outwardly and all tarsi, yellow; wings yellowish tawny, the forewings slightly darker at the apices; venation light brown.

Type. — ♀; North America, (Banks), [British Museum. (Natural History)].

The type of *Scolia sexcincta* Fabricius, a male from North America (Rohr), may be either at Kiel or Copenhagen. The types of *Sapyga subulata* Say, males from Missouri and Pennsylvania, are probably no longer in existence. The type of *Myzine proxima* Guérin, a male from North America, is probably in the Museo Civico di Storia Naturale at Turin.

The type of *quinquecincta* (Fabr.) is in the Banks collection in the British Museum (Natural History). Turner (1909) has examined the specimen and states that it is a female of the common North American species. Fabricius' description states "antennes breves, flavescentes" and the other color characters check, so Turner's interpretation is undoubtedly correct. He also includes a note stating that he has seen a male in the Banks collection labeled *sexcincta* (Fabr.), not the type which was described from the Rohr collection, and that it is the male of *quinquecincta*. There is considerable doubt as to whether the males of *quinquecincta* are identical with the type of *sexcincta*. Some authors place the latter species in the synonymy of the former as I have done while others consider that *sexcincta* is a West Indian species. Nothing can be done with the original description as it applies to almost any of the eastern males from the United States and West Indies. Fabricius (1775) states that the habitat of *sexcincta* is America and later (1805) that the habitat is the West Indies. However, he gives England as the type locality of *quinquecincta* so it is apparent that one cannot depend on the localities the early specimens were supposed to have come from.

I have placed *subulata* (Say) in the synonymy as the description states that the wings are "tinged with ferruginous". I have seen no males with ferruginous wings, but males of *quinquecincta* have the wings more strongly infumated than the males of any other species. Also Say states that his specimens came from Missouri and Pennsylvania and were not uncommon. *Proxima* (Guér.) is also placed in the synonymy as the description states that the last segment is terminated by a transverse yellow band which is an important recognition character of *quinquecincta* males.

Specimens examined: 1673♀ and 2223♂.

CANADA: 2♀, Montreal, Can[ada], [C.U., A.N.S.P.].

NEW HAMPSHIRE: 2♂; Hanover, Nelson; July 15, 1907; [U.S.N.M., A.N.S.P.].

MASSACHUSETTS: 3♀, 7♂; Woods Hole, Gloucester, Oak Bluffs, Hyannisport, Cuttyhunk Island, Framingham; July 18-Sept. 7; [U.S.N.M., H.S.P.A., C.U., A.M.N.H., I.N.H.S.].

RHODE ISLAND: 1♀, Providence, Sept. 6, [A.N.S.P.].

CONNECTICUT: 9♀, 10♂; Westport, Black Point, Hartford; July 28-Aug. 23; [I.N.H.S., A.M.N.H., U.S.N.M., A.N.S.P.].

NEW YORK: 124♀, 59♂; Bolton, Poughkeepsie, Patterson, West Farms (New York City), Brownsville, Crugers, Mosholu, Pelham, Palisades, Scarsdale; Long Island—Huntington, Hillside (Jamaica), Flatbush, Yaphank, Cedarhurst, Cold Spring Harbor, East Quogue, Hicksville, Roslyn, Babylon, Dix Hills; Staten Island; Fisher's Island; Gardiner's Island; July 17-Sept. 19; [A.N.S.P., I.N.H.S., B.P.I., G.R.F., C.U., A.M.N.H., U.S.N.M., K.V.K., H.K.T.].

NEW JERSEY: 57♀, 33♂; Wenonah, Point Pleasant, Cape May Point, Cape May, Angora, Adele, Pitman, Riverton, Camden County, Medford, Boonton, Westville, Merchantville, Laurel Springs, Ramsey, Matawan, Paterson, New Brunswick, Fairlawn; June 3-Sept. 8; [A.N.S.P., C.U., U.S.N.M., U.M., B.P.I., I.N.H.S., A.M.N.H.].

PENNSYLVANIA: 53♀, 41♂; Enola, Lackawaxen, Plymouth, Bloomsburg, Delaware Water Gap, Lemoyne, Rockville, Harrisburg, Wetzel's Swamp (Harrisburg), Hummelstown, Eberly's Mill, Stewartstown, North Cumberland, Carlisle, Camphill, Swarthmore, Castle Rock, Delaware County, Lawndale, Mt. Airy, Mount Moriah, Philadelphia, Philadelphia Neck, Roxborough, Pike County, Homebrook (Lower Merion Township), Lewisburg; June 7-Oct. 7; [U.S.N.M., A.M.N.H., K.V.K., C.U., B.P.I., A.N.S.P.].

MARYLAND: 28♀, 16♂; Chesapeake Beach, Cambridge, Camp Meade, Prince George Co., Edgewood, Baltimore, Laurel, Glen Echo, Chestertown; May-Aug. 24; [U.N., K.S.C., U.S.N.M., U.M., C.U., A.N.S.P.].

DISTRICT OF COLUMBIA: 10♀, Washington, Aug., [U.S.N.M., H.S.P.A.].

VIRGINIA: 63♀, 86♂; Hampton, Falls Church, East Falls Church, Fort Humphreys, Cape Charles, Warrentown, Alexandria (Arlington Co.), Dayton, Vienna, Clifton, Kearney, Barcroft; June 1-Sept. 16; [C.S.B., U.S.N.M., A.N.S.P., C.U., U.M., K.V.K., U.N.].

NORTH CAROLINA: 2♀, 2♂; Raleigh, Kittrell; July 7-16; [C.S.B., K.V.K.].

GEORGIA: 1♂, Tifton, June 21, 1896, [A.N.S.P.].

FLORIDA: 1♀, Jacksonville, July 14, 1913, [H.S.P.A.].

OHIO: 13♀, 2♂; Sandusky, Jug Run (Smithfield), Hocking County; Aug. 4-10; [O.S.U.].

MICHIGAN: 2♀, 5♂; Grand Rapids, Romeo; July 24-Aug. 3; [H.E.M.].

WISCONSIN: 12♀, 7♂; Milwaukee, Fort Atkinson, Dane County, Tower Hill, Madison, Gays Mills; June 30-Sept.; [U.S.N.M., C.U., W.S.M., U.W.].

ILLINOIS: 57♀, 109♂; Chicago, Virginia, Galesburg, Mount Vernon, Wapella, Urbana, Waukegan, Ashley, DeSoto, Elmira, Monticello, East St. Louis, Aurora, Charleston, Leroy, Havana, Meredosia, Algonquin, Barry, Champaign, Heyworth, Cobden, Bloomington, Danville, Homer Park, Rock Island, Moline, Dubois, Laurenceville, Rockford, White Heath, Lake Senachwine (Putnam), Carbondale, Browns, Zion, Peoria, Toluca, Volo, Morton, Salts, Adams County, McClure, Beach, Herod, Harrisburg, Muncie, Alton; June-Oct.; [A.N.S.P., C.U., U.S.N.M., H.S.P.A., U.M., A.M.N.H., I.N.H.S.].

INDIANA: 80♀, 115♂; Plymouth, Lafayette, Ind[iana]; July-Sept.; [M.S.A.C., C.S.A.C., U.S.N.M.].

KENTUCKY: 3♀, 1921, [M.S.A.C.].

TENNESSEE: 1♂, Memphis, Sept. 16, 1921, [M.S.A.C.].

MISSISSIPPI: 27♀, 6♂; Nettleton, Lamont, Kiln, Agricultural College; April 4-Oct. 18; [M.S.A.C.].

LOUISIANA: 14♀, 6♂; Chesdrough, L[ouisian]a, Mound, Plaquemine, Schriever, Jennings, Lafayette; Jan. 12-Dec.; [M.S.A.C., S.L.I., U.S.N.M., C.U.].

TEXAS: 94♀, 245♂; Bastrop County, Williamson County, Lee County, College Station, Brazos County, Waterloo, Taylor, McDade, Colorado County, 3½ mi[les] N[orth] W[est] of Rock Island, Rock Island, Eastland County, Paris, New Braunfels, Galveston, Round Mountain, Sutherland

Springs, Victoria, Clarendon, Cypress Mills, Post & Crosbyville, Wilson County, McLennan County, Dickinson, Houston, McKinney, Bexar County; May 13-Oct. 26; [J.E.G., U.M., U.S.N.M., C.U., K.U., A.N.S.P., L.A.M., T.A.M., M.S.A.C., H.B.P.].

ARKANSAS: 1♀, 1♂; Marion Co., Imboden; June 17-Aug. 9; [H.A.S., U.S.N.M.].

OKLAHOMA: 4♀, 2♂; McAlester, South McAlester, Ardmore; June 11-July 11; [K.S.C., A.M.N.H., U.S.N.M.].

MISSOURI: 13♀, 32♂; Willard, Springfield, Mound City, Atherton, Kansas City; June-Aug. 28; [C.U., U.N., U.W., H.S.P.A.].

KANSAS: 483♀, 609♂; Wellsville, S[outh] of Coolidge, E[ast] of Kanorado, Riley County, Clearwaters, Fort Hays, Hays, Arcola, Wakeeney, Onaga, Manhattan, Garrison, St. George, Topeka, Abilene, Baldwin, Cloud County, Meade County (2500 ft.), Rooks County, Medora, Franklin County (895 ft.), Stafford County, Comanche County (2069 ft.), Kiowa County (2250 ft.), Logan County (3322 ft.), Pratt County (1900 ft), Wallace, Wallace County (3000 ft.), Osborne County (1557 ft.), Douglas County (900 ft.), Ellsworth County, Finney County, Reno County, Trego County (2450 ft.), Norton County, Philips County, Decatur County (2560 ft.), Marshall County, Rice County, Rawlins County (2850 ft.), Republic County, Jewell County, Linn County, Cheyenne County (3300 ft.), Scott County (2970 ft.), Washington County, Lawrence, Freeley County (3550 ft.), Wichita County (3300 ft.), Seward County (2600 ft.), Sherman County (3690 ft.), Clark County (1950 ft.), Ellis County (2000 ft.), Ness County (2260 ft.), Russell County (1830 ft.), Morton County (2800 ft.), Sheridan County (2650 ft.), Stanton County (3000 ft.), Smith County (1800 ft.), Graham County (2130 ft.), Pawnee County, Barber County (1468 ft.), Cherokee County (888 ft.), Elk County (1008 ft.), Labette County (899 ft.), Wilson County (866 ft.), Neosho County (896 ft.), Crawford County (993 ft.), Sedgwick County (1291 ft.), Grant County (2800 ft), Anderson County (1047 ft.), Dickenson County, Summer County (1189 ft.), Bourbon County (800 ft.), Kingman County (1516 ft.), Morton County (3200 ft.), Harper County (1417 ft.), Harvey County, Hodgman County, Allen County (962 ft.), Butler County (1285 ft.), Chatauqua County (841 ft.); June 17-Oct.; [C.S.A.C., U.C., K.S.C., A.N.S.P., I.N.H.S., H.A.S., U.S.N.M., K.U.].

IOWA: 21♀, 53♂; Lake Okaboji, Ledges State Park (Boone), Fort Madison, Ames; June-Sept. 18; [H.A.S., A.N.S.P., A.M.N.H., B.Y.U., U.C., C.S.A.C.].

NEBRASKA: 132♀, 190♂; Kearney, Elm Creek, Fairmont (Fillmore Co.), Halsey, Omaha (Douglas Co.), Meadow (Sarpy Co.), Louisville (Cass Co.), Weeping Water (Cass Co.), South Bend (Cass Co.), South Sioux City (Douglas Co.), Roca (Lancaster Co.), Cedar Bluffs (Saunders Co.), West Point (Cuming Co.), Niobrara (Knox Co.), Neligh (Antelope Co.), Carns (Rock Co.), Curtis (Frontier Co.), McCook (Redwillow Co.), Gordon

(Sheridan Co.), Haigler (Dundy Co.), Pine Ridge (Dawes Co.), Glen (Sioux Co.), Monroe Canyon (Sioux Co.), Gering (Scotts Bluff Co.), Mitchell (Scotts Bluff Co.); June 25-Sept. 19; [H.A.S., U.M., U.N.].

MINNESOTA: 6♀, 31♂; Lake City, R[iver] N[orth of] Lawrence (Carver Co.), Ramsey County, Washington County, Grey Cloud Island, Barden sand dunes (Scott Co.), University Farm (St. Paul), St. Paul, R[iver] N[orth of] Henderson (Sibley Co.), Fort Snelling, St. Cloud, Hennepin County, Minnehaha Park (Hennepin Co.), Andover (Anoka Co.), Rice Creek (Anoka Co.), Fridley sand dunes (Anoka Co.); July 7-Aug. 27; [U.M.].

SOUTH DAKOTA: 2♀, 7♂; Hot Springs, Volga, Springfield, Martin, Elk Point, Sylvia; Aug. 17-Sept. 14; [U.N., A.N.S.P., H.C.S.].

MONTANA (?): 2♀; Bridger's Pass Expedition, Sand Hills (South Fork); [A.N.S.P.].

WYOMING: 1♂, Laramie Mts., Aug. 1895, [K.U.].

COLORADO: 9♀, 76♂; Loveland (4982 ft.), Crowley, Denver, Greeley, Fowler, S[outh] of Eads, Two Buttes Reservation, S[outh] of Lamport, E[ast] of Burlington, S[outh] of Burlington, S[outh] of Cheyenne Wells, N[orth] of Chivington, S[outh] E[ast] of Prowers, Holly, Tobe, Walker Hill (Crowley Co.), Pueblo, Crook, Ward, Wray, White Rocks (Boulder Co.), Boulder, Cascade; July 3-Sept. 9; [C.S.A.C., B.Y.U., U.C., B.P.I, I.N.H.S., A.N.S.P., A.M.N.H.].

NEW MEXICO: 4♀, 5♂; S[outh] E[ast] of Raton, Magdalena Mts., El Rito, Roswell; Aug.; [U.C., K.U., U.S.N.M.].

CALIFORNIA: 1♀, Los Angeles, [C.U.].

No data: 276♀, 453♂; [various collections].

Flower Records.—*Dicrophyllum marginatum, Eysenhardtia amorphoides, Sagittaria latifolia, Rhus copallina, Acerates floridanus, Asclepias incarnata, A. Sullivantii, A. syriaca, A. verticillata, Gonolobus laevis, Campanula americana, Antennaria neodioica, Aster ericoides, A. paniculatus, Baccharis neglecta, B. salicina, Bidens aristosa, Erechtites hieracifolia, Eupatorium altissimum, E. perfoliatum, E. serotinum, Gutierrezia Sarothrae, Hymenopappus carolinensis, Lepachys columnaris, Parthenium Hysterophorus, P. integrifolium, Rudbeckia subtomentosa, R. triloba, Solidago canadensis, S. glaberrima, S. graminifolia, S. missouriensis, Verbesina virginica, Vernonia fasciculata, Echinocystis lobata, Euphorbia corollata, E. marginata, Blephilia hirsuta, Leonurus Cardiaca, Mentha arvensis, Monarda punctata, Nepeta Cataria, Pycnanthemum flexuosum, P. pilosum, P. virginianum, Cassia Chamaecrista, Melilotus alba, Petalostemum candidum, P. purpureum, Psoralea Onobrychis, Trifolium repens,* *Polygonum hydropiper, P. hydropiperoides, P. lapathifolium, P. pennsylvanicum, Ceanothus americanus, Cephalanthus occidentalis, Ptelea trifoliata, Salix longifolia, Tilia americana, Cicuta maculata, Daucus carota, Eryngium yuccifolium, Oxypolis rigidior, Pastinaca sativa, Sium cicutaefolium, Verbena stricta, V. urticaefolia, Vitex negundo incisa, Cissus arborea, Symphoricarpos orbiculatus.*

Myzine navajo new species (Text-fig. 8.)

The extremely coarse, radiating rugae on the posterior surface of the propodeum separate *navajo* females from all other North American species. The inflated bulb with its ventral lamella of the aedeagus of the male genitalia separate that sex from all Nearctic species. The males are usually larger than those of *frontalis* Cresson and *dubiosa* Cresson and more abundantly marked with yellow than *maculata* (Fabricius) males but the genitalia alone separate the males of *spilonota* (Cameron).

Navajo is not closely related to any of the Nearctic species and finds its closest relatives in several females from Brazil which I have examined (species undetermined) having the same type of propodeal structure.

♀. 18 mm. long. Clypeus with strong punctures on the entire surface and many interspersed minute ones on the basal portion; front shining and with large punctures many of which are confluent; vertex shining and practically impunctate; pronotal disk shining with large well-separated punctures (some of the lateral ones are confluent) and with several minute ones on the anterior margin medianly; mesonotum and scutellum shining and with extremely large, well-separated punctures; postscutellum with a few large punctures medianly and minute ones laterally; dorsal surface of propodeum opaque with many large confluent punctures medianly and several transverse striae laterally; posterior surface of propodeum covered with extremely coarse rugae which radiate outwardly from the abdominal insertion to meet the oblique rugae on the lateral surfaces; mesepisternum with large punctures some of the first degree density; abdomen shining, tergites one to five with scattered minute punctures.

Black; mandibles except apices, apex of clypeus, antennae, tegulae, middle and hind tibiae and all tarsi, dark ferruginous; spot on frontal lobes, band on inner eye margin, band on temples along outer eye margin, very small spot on neck, elongate spot on antero-lateral corners of pronotal disk extending back nearly to the posterior margin, elongate spot laterally on mesonotum and a larger median spot, band on postscutellum, lateral band on posterior surface of propodeum, large spot on mesepisternum below tegula, lateral spots on tergites one to five inclusive, those on the first more narrowly separated and those on the second more widely separated than the remainder, lateral spots on sternites two to four inclusive, yellow; spot on hind coxa and a narrow band on outer surface of fore tibia, yellow; wings hyaline, with a pearly iridescence, the forewing infumated along the costal margin; venation dark brown basally and testaceous apically.

Female paratypes vary in length from 15 to 21 mm. and have the following color differences: a minute spot present on posterior margin of vertex medianly, spot on temple lacking, spot on neck lacking, spots on pronotum united posteriorly, small spot present on scutellum, lateral bands on posterior surface of propodeum lacking, lateral spots on tergites one and three to five inclusive narrowly united anteriorly, lateral spots present on fifth sternite or entirely lacking on all sternites.

♂. 16 mm. long. Clypeus shining and closely punctured; front closely punctured, the vertex less closely; pronotum and mesonotum rather closely punctured, the scutellum and postscutellum less so; dorsal surface of propodeum closely punctured; posterior surface of propodeum striato-punctate; mesepisternum closely punctured; lateral surface of propodeum striato-punctate; abdomen shining, tergites one to six inclusive with numerous fine punctures; pygidium slightly concave and with several large punctures on the surface and a few fine striae cephalad of the emargination.

Black; mandibles except apices, clypeus, band on inner margins of eyes to emargination, frontal lobes, spot beneath on scape, minute median spot on vertex, anterior (interrupted medianly and extending down on the propleura) and posterior margins of the pronotal disk, tegulae except apices which are testaceous, small spot on postero-lateral corners of mesonotum and a larger median spot, large spot on scutellum, band on postscutellum, lateral spots on posterior surface of propodeum narrowly separated medianly and emarginate antero-laterally, large spot on mesepisternum below tegula and a smaller one above middle coxa, apical bands on tergites one to six inclusive, that on the first deeply emarginate medianly, those on second and third slightly narrowed medianly, those on fifth and sixth emarginate laterally, and transverse lateral spots on sternites two to six inclusive narrowly separated medianly, yellow; spot on anterior surface of fore coxa, spots on middle and hind coxae, apical half of all femora, all tibiae outwardly, and all tarsi except the apical joints of the middle and hind pairs, yellow; wings hyaline, the apices of the forewings slightly infumated; venation testaceous.

Male paratypes vary in length from 13 to 16 mm. and differ structurally as follows: a well-developed transverse groove below the tegula on the mesepisternum, lateral surfaces of propodeum punctate only, and the minute striae on the pygidium may be lacking. The color varies as follows: spot lacking on vertex, lateral spots on posterior surface of propodeum widely separated and lateral spots on sternites widely separated.

Holotype.— ♀ ; Florence, Arizona, August 25, 1903, (C. R. Biederman), [Academy of Natural Sciences of Philadelphia, Type no. 4186].

Allotype.— ♂ ; Ariz[ona], [Academy of Natural Sciences of Philadelphia].

Paratypes.—1 ♂, Florence, Arizona, July 10, 1903 (C. R. Biederman) [A.N.S.P.]. 1 ♀, 1 ♂, July 23, 1903, (C. R. Biederman) [A.N.S.P.]. 20 ♀, 1 ♂, August 25, 1903, (C. R. Biederman) [A.N.S.P.]. 1 ♀, September 4, 1903, (C. R. Biederman), [A.N.S.P.]. 3 ♀, 2 ♂, Nogales, Arizona, August 30, 1927, (J. C. Bradley, [C.U.]. 1 ♀, Pajarito Mts., Nogales, Arizona, August 31, 1927, (J. D. Hood), [C.U.]. 2 ♀, Hassayampa, Maricopa Co., Arizona, August 26, 1927, (J. C. Bradley), [C.U.]. 1 ♀, August 26, 1927, (J. D. Hood), [C.U.]. 1 ♀, Aguila, Maricopa County, Arizona, August 21–22, 1927, [C.U.]. 1 ♂, Ariz[ona], [A.N.S.P.]. 1 ♀, Wickenburg, Arizona, August 25, 1927, [C.U.]. 8 ♀, Mesa, Arizona, October 11, 1925, (A. A. Nichol), [U.A.]. 1 ♀, Hereford, Cochise County, Arizona, (W. M. Mann), [C.U.]. 1 ♀, Sacaton, Arizona, (Geo. Harrison), [U.S.N.M.]. 9 ♂, Tempe, Arizona, August 18, 1926, (J. C. McClain), [U.S.N.M.]. 3 ♂, Tucson, Arizona, August 9, 1930, (T. F. Winburn & R. H. Painter), [K. S. C.]. 10 ♀, Phoenix, Arizona, August 10–20, 1908, [C.U.]. 1 ♀, May 12, 1934, (R. H. Crandall), [K.V.K.]. 1 ♂, September 25, 1934, (R. H. Crandall), [K.V.K.]. 5 ♀, October 15, 1934, (R. H. Crandall), [K.V.K.]. 2 ♀, November 1, 1934, (R. H. Crandall), [K.V.K.]. 2 ♀, Hermosillo, Sonora, Mexico, September 1, 1908, [C.U.].

Myzine maculata (Fabricius) (Text-fig. 11.)

1793. *Tiphia maculata* Fabricius, Ent. Syst., p. 224, no. 4. [♀.]
1801. *Tiphia maculata* Coquebert, Illustr. icon. insect., p. 54, pl. 13, fig. 2. [♀.]

1803. *Myzine maculata* Latreille, Nouv. Dict. d'Hist. Nat., xv, p. 326. [♀.]
1806. *Tiphia namea* Panzer (*nec* Fabricius), Krit. Rev. Ins. Deutsch., II: iii-iv, pl. 1, figs. d-f. [♀.]
1806?. *Sapyga majorta* Panzer, Krit. Rev. Ins. Deutsch., II, iv-v, pl. 2, figs. d-e. [♂.] (New synonymy.)
1807. *Plesia maculata* Jurine, Nouv. Meth., p. 152. [♀.]
1824. *Tiphia interrupta* Say, Narr. Exped. St. Peter's Riv., p. 322, no. 2. [♀.] (New synonymy.)
1835?. *Myzine hamatus* Say, Boston Journ. Nat. Hist., I, p. 300, no. 1. [♂.]
1837. *Meria costata* Say, Boston Journ. Nat. Hist., p. 360, no. 1. [♀.]
1855. *Myzine interrupta* Smith, Cat. Hym. Br. Mus., III, p. 79, no. 50.
1865. *Myzine hyalina* Cresson, Proc. Ent. Soc. Phila., IV, pp. 442-3. [♂.] (New synonymy).
1887. *Myzine costata* Cresson, Trans. Am. Ent. Soc., XIV, Suppl., p. 268.
1887. *Myzine maiorta* Cresson, Trans. Am. Ent. Soc., XIV, Suppl. Vol., p. 268.
1916. *Elis interrupta* Rohwer, Connecticut Geol. & Nat. Hist. Surv. Bull. 22, pp. 617-8. [♀, ♂.]
1920. *Elis floridanus* Rohwer, Proc. Ent. Soc. Wash., XXII, pp. 54-6. [♀, ♂.] (New synonymy.)
1927. *Elis interrupta* Brimley, Ent. News, XXXVIII, p. 237. [♀, ♂.]

The females of this species are subject to a great deal of variation in puncturation and coloration particularly in the extreme southeastern and southwestern states. They are usually separated from other small females by the median longitudinal band of minute punctures on the pronotal disk and the strongly infumated costal margin of the forewing. These punctures are frequently absent and the forewings either entirely hyaline or uniformly infuscated; this variation is a good deal like *dubiosa* in the southeastern states and *dubiosa* and some *frontalis* in the southwestern states. These females can be separated definitely only by reference to the genitalia of males captured at the same locality and date. In addition to the more extensive yellow markings, specimens from the southeastern states frequently have a good deal of ferruginous on the legs and antennae.

Maculata males are easily separated from the larger species by the glossy pygidium and groove on the mesepisternum. In the western states they may be confused with *dubiosa* males but the narrower bands on the tergites will usually separate them from that species.

♀. 11-18 mm. long. Clypeus shining with large well-separated punctures and minute interspersed ones; front shining with large well-separated punctures; vertex shining, the puncturation sparser than on front; pronotal disk shining with large well-separated punctures and minute interspersed ones on the median third (practically absent in some southern specimens); mesonotum and scutellum shining with large well-separated punctures; postscutellum shining with several large punctures medianly and minute ones laterally; dorsal surface of propodeum with several large punctures, occasionally a raised elevation medianly bearing these punctures, and laterally with numerous minute punctures; posterior surface of propodeum subopaque with several fine striae; mesepisternum shining with large well-separated punctures; lateral surfaces of propodeum shining with numerous fine, oblique striae; abdomen shining, tergites one to five inclusive with numerous minute punctures.

Black; spot on lateral corners of clypeus (occasionally absent), spot on frontal lobes confluent with narrow band along inner eye margin, band behind eyes, spot on antero-lateral corners of pronotal disk, tegulae except apices which are testaceous, small lateral and large median spots on mesonotum, median spot on scutellum, band on postscutellum, lateral band on posterior surface of propodeum, large spot on mesepisternum below tegula and a smaller spot above middle coxa, posterior band on lateral surface of propodeum usually confluent with the lateral band on the posterior surface, large confluent spots on first abdominal tergite, lateral spots on second and fifth tergites, and basal bands on third and fourth tergites (all segments may be banded basally), and lateral spots on the second and third and occasionally the fourth and fifth sternites, yellow; spot on hind coxa and band on outer surface of fore tibia, yellow; middle and hind tibiae and all tarsi, yellow ferruginous; wings hyaline, the costal margin of the forewing deeply infumated; venation testaceous.

♂. 8-16 mm. long. Clypeus with large confluent punctures; front shining, rather closely punctured; vertex shining and sparsely punctured; pronotum, mesonotum, scutellum and post-scutellum shining and with large well-separated punctures; dorsal surface of propodeum closely punctured; posterior surface of propodeum closely punctured to striato-punctate to rugose-reticulate; mesepisternum shining with large well-separated punctures and a transverse carina below the tegula set off by a posterior groove; lateral surface of propodeum shining, punctate to striato-punctate; abdomen shining, tergites one to six inclusive with numerous minute punctures; pygidium flat and shining with a few large punctures.

Black; mandibles except apices, clypeus, spot on frontal lobes, scape beneath, band along inner eye margin to emargination, band on anterior (interrupted medianly and extending down on the propleura) and posterior margins of pronotal disk, tegulae except apices which are testaceous, elongate lateral and larger median spots on mesonotum, large median spot on scutellum, band on postscutellum, elongate spot laterally on posterior surface of propodeum emarginate antero-laterally, large spot on mesepisternum below tegula and a smaller one above middle coxa, apical bands on tergites one to six inclusive, those on the first and second emarginate medianly on the anterior margin, and those on the fifth and sixth emarginate laterally on the anterior margin, elongate, transverse spots on apical margins of second to sixth sternites inclusive, sometimes united medianly, yellow; anterior surface of fore coxa, spots on middle and hind coxae, apices of all femora, narrow lines on all tibiae (occasionally the entire outer surface) and all tarsi except the apical joints of the middle and hind pairs, yellow; wings hyaline, the apices of the forewings slightly infumated; venation testaceous to dark brown.

Type.—♀ ; Georgia, (Olivier).

The type of this species may be at Kiel, Copenhagen or the Muséum National d'Histoire Naturelle.

The type of *Sapyga majorta* Panzer, a male from Carolina, should be in the Zoological Museum in Berlin. The types of *Tiphia interrupta* Say, a female from Pennsylvania, of *Myzine hamatus* Say, a male from Indiana and of *Meria costata* Say, a female from Indiana, are probably no longer in existence. The holotype of *Myzine hyalina* Cresson, a male from the mountain region of the Colorado Territory, 1864, (Ridings), is in the Academy of Natural Sciences at Philadelphia [Type no. 574] as well as one male paratype bearing the same data. The type series of *Elis floridanus* Rohwer, consisting of an holotype female, allotype male, one paratype female and one paratype male, all from Inverness, Florida (Robertson), is in the United States National Museum.

Maculata (Fabr.) was described from a female from Georgia. Coquebert (1801) has figured a female of this species which was determined by Fabricius and it is quite apparent that *maculata* is the species which has been accepted by all American entomologists as *interrupta* (Say). The specimen figured by Panzer as *majorta* (Panz.) is probably a male of *maculata* judging from its small size and the narrow bands on the tergites. *Interrupta* (Say) was described from a female from Pennsylvania. The pronotum bears only a pair of spots and the wings are hyaline with an infumated costal margin. *Maculata* is the only species occurring in Pennsylvania which has these characters. The same remarks apply to *costata* (Say) described from a female from Indiana. *Hamatus* Say described from a male from Indiana may be a male of *maculata* but it is impossible to decide exactly from Say's description. I have examined the holotype and single paratype of *hyaline* Cress. and externally the specimens might belong to either *frontalis* Cress., *dubiosa* Cress. or *maculata*. The genitalia of the paratype are identical with those of *maculata* so I have entered it under the synonymy of that species. I have also examined the type series of *floridanus* (Roh.) from Inverness, Florida. The males are somewhat larger than the average size of *maculata* but they bear a transverse groove on the mesepisternum below the tegula and the genitalia of the paratype are the same as *maculata*. The females are also larger than the average size, have a transverse band on the posterior margin of the pronotal disk and yellowish wings but I have seen other females from Florida having this coloration which I have definitely associated with *maculata* males from the same localities and dates of capture.

Specimens examined: 692♀ and 995♂.

MASSACHUSETTS: 2♂, Springfield, [U.S.N.M.].

CONNECTICUT: 1♀, Wallingford, [U.S.N.M.].

NEW YORK: 1♀, 8♂; Gardiner's Island, Yaphank, L[ong] I[sland]; July 12-Aug. 23; [I.N.H.S., A.M.N.H., U.S.N.M.].

NEW JERSEY: 44♀, 77♂; Lucaston, Wenonah, Delair, Milltown, Cassville, Fairlawn, Lakehurst, Manumuskin, Malaga, Anglesea, Washington Park (Camden Co.), Medford Lakes, Clementon, Woodbury, Point Pleasant, Menantico, Lawnside, Adele, Riverton; July 10-Sept. 23; [U.S.N.M., B.P.I., A.M.N.H., K.U., C.U., I.N.H.S., A.N.S.P.].

PENNSYLVANIA: 3♀, 14♂; Mount Hope, Highspire, Huntingdon, Craigheads, P[ennsylvani]a; June 19-Aug. 8; [B.P.I., K.V.K., U.S.N.M., A.N.S.P].

MARYLAND: 3♀, 7♂; Prince George County, Cabin John, Chestertown, Chesapeake Beach, Boonsboro; July 15-Sept. 3; [U.S.N.M., U.M., A.N.S.P.].

WEST VIRGINIA: 2♀, 1♂; Lewisburg, Baileysville; July-Aug. 13; [H.K.T., K.V.K., U.S.N.M.].

VIRGINIA: 35♀, 84♂; Dayton, East Falls Church, Falls Church, Roanoke, Clarendon, Wingina, Hinton, Glencarlyn, Vienna, Clifton, Barcroft; May 5-Sept. 3; [K.V.K., U.N., A.N.S.P., U.S.N.M.].

NORTH CAROLINA: 36♀, 12♂; Ashville, Dillsboro, Raleigh, Elizabeth City, Swannanoa, Murphy, Cane River, Landis, Jackson, Black Mts., Valley of Black Mts., Southern Pines; June 13-Sept. 27; [C.U., A.M.N.H. U.S.N.M. C.S.B.].

SOUTH CAROLINA: 7♀, 7♂; Murrell's Inlet, Horry County, McClellanville, Greensville, Myrtle Beach; June 12-Sept. 11; [K.V.K., H.K.T., U.S.N.M.].

Georgia: 12♀, 47♂; Armuchee, Kennesaw Mt., Atlanta, Thomson's Mills, St. Simon's Island, Stone Mt., Blairsville, Helen, Cairo, Dalton, Macon, Tifton, Billy's Island (Okefenokee Swamp), Groveland (Canoshe River), Bainbridge, Toccoa; May 30-Oct.; [C.U., U.S.N.M., A.M.N.H., A.N.S.P., P.W.F.].

Florida: 35♀, 69♂; Jacksonville, Fort Myers, Inverness, Miami, Buena Vista, Orlando, Capron, Ocala, Tampa, Homestead, Orange County, Sumter County, Seminole County, Citrus County, Lake County, Osceola County, Brevard County, Hamlin Grove, East Florida, Brooksville, Gainesville, Crescent City, Titusville, Clearwater, Pensacola, St. Petersburg, Indian River, Cedar Keys, Fernandina, Port Orange, Little River, Fort Lauderdale; Febr. 7-Dec. 14; [C.U., A.N.S.P., G.R.F., A.M.N.H., P.W.F., I.N.H.S., U.S.N.M.].

Ohio: 7♀, 17♂; Marietta, Launce County, Galba County, Pike County, Hocking County; July 20-Aug. 24; [U.S.N.M., O.S.U.].

Michigan: 1♀, 2♂; Grand Rapids, Mich[igan]; Aug. 11; [H.E.M., U.S.N.M.].

Wisconsin: 3♀, 1♂; Mazo Manie, Gays Mills, Madison; Aug. 3-Sept. 15; [U.W.].

Illinois: 35♀, 33♂; Carlinville, Makanda, Waukegan, Albion, Meredosia, Danville, Pekin, Arenzville, DuBois, North Illinois, Buda, White Heath, Milford, Bloomington, Muncie, Jonesboro, Normal, Alto Pass, Bath, Teheran, Forest City, Havana, White Oak Run, Jonesboro, Fountain Bluff; Aug. 4-Oct. 22; [U.S.N.M., I.N.H.S.].

Indiana: 11♀, 28♂; Vincennes, Lafayette; July 3-Sept. 28; [U.S.N.M., A.M.N.H.].

Tennessee: 1♂, Tenn[essee], [K.U.].

Alabama: 1♀, 14♂; Thomasville, Ala[bama]; June 10; [C.U., U.S.N.M.].

Mississippi: 1♀, 1♂; Lucedale, Agricultural College; May 28-Sept. 30; [M.S.A.C.].

Louisiana: 6♀, 6♂; Orange, Plaquemine, Logansport, L[ouisian]a; Jan. 17-Aug. 23; [U.S.N.M.].

Texas: 27♀, 44♂; Bastrop County, McDade, Brownsville, El Paso, Overton, Columbia, Jacksonville, Rio Grande (Brewster Co.), Padre Island, Donna, Weslaco, Bexar County, College Station, Laguna (Neuces River), Katherine, Devil's River, Trinity; April 16-Oct. 10; [J.E.G., U.S.N.M., T.A.M., H.B.P., C.U., A.N.S.P.].

Oklahoma: 1♀, Bogey Creek, Sept. 6, [U.S.N.M.].

Missouri: 3♀, 1♂, Kansas City, Aug. 8, [H.S.P.A., U.S.N.M.].

Kansas: 61♀, 120♂; Seward County (2600 ft.), Smith County (1800 ft.), Kingman County (1516 ft.), Harvey County, Douglas County (900 ft.), Dickinson County, Baldwin, Clay County, Doniphan County, Onaga County, Manhattan, Topeka, Riley County; July 9-Oct.; [K.U., U.S.N.M., K.S.C.].

NEBRASKA: 57♀, 88♂; Kearney, Halsey, Fairmont (Fillmore Co.), Niobrara (Knox Co.), Haigler (Dundy Co.), Gordon (Sheridan Co.), Ashland (Saunders Co.), Mitchell (Scotts Bluff Co.), Lincoln (Lancaster Co.), Louisville (Cass Co.), Glen (Sioux Co.), Omaha (Douglas Co.); July 12-Sept. 9; [H.A.S., U.M., U.N.].

MINNESOTA: 8♂; Rice Creek (Anoka Co.), Fridley sand dunes (Anoka Co.); July 19-Aug. 11; [U.M.].

COLORADO: 1♀, 18♂; La Junta, Boulder, Jim Creek (near Boulder), Wray (3700 ft., 40° 0′ N[orth], 102° 10′ W[est]), Denver, Colo[rado]; July 22-Aug. 19; [I.N.H.S., A.M.N.H., U.S.N.M., A.N.S.P.].

UTAH: 8♀, 10♂; Zion National Park, Provo (4750 ft., 40° 18′ N[orth], 111° 42′ W[est]), Ut[ah]; July 29-Aug. 1; [B.Y.U., A.M.N.H., U.S.N.M.].

NEVADA: 1♀, Mesquite, July 22, [A.M.N.H.].

NEW MEXICO: 4♀, 26♂; Colorado, Albuquerque (5000 ft.), Mesilla Park, Organ Mts. (La Cueva, 5300 ft.), Las Cruces, N[ew] M[exico]; June 27-Aug. 28; [U.S.N.M., H.A.S.].

ARIZONA: 73♀, 138♂; Tempe, Apache Camp (Santa Catalina Mts.), Sabino Basin (Santa Catalina Mts.), Sacaton, Somerton, Yuma, Phoenix, Oak Creek Canon (6000 ft.), Bill Williams' Fork, Wickenberg, Nogales, Santa Rita Mts., San Carlos Lake, Tubac, Mesa, Ruby, Tucson, Texas Pass, Fort Grant (Pinaleno Mts.), Kits Peak Rincon (Baboquivari Mts.), Southern Arizona, Walnut, Das Cabezos (Cochise Co.); May 19-Nov.: [U.S.N.M., C.U., A.M.N.H., K.V.K., H.A.S., K.U., K.S.C., U.A., G.R.F., A.N.S.P.].

CALIFORNIA: 97♀, 53♂; Geyserville, Lemon Cove (Tulare Co., 500 ft.), Claremont, Arch Beach, San Bernardino, Banning, Victorville, San Gabriel Mts., Experimental Farm (Imperial Valley), Redlands, Los Angeles Co., Grossmont (near San Diego), Colton, Whittier, Riverside, Palm Canon (Colorado Desert, 1000 ft.), Southern California, 15 mi[les] S[outh] of Indio; March 5-Oct. 30; [C.U., L.S.A.G., A.N.S.P., K.S.C., H.A.S., U.M., P.H.T., G.R.F., U.S.N.M.].

MEXICO: 1♂, Las Parras, Baja California, Oct. 1923, (W. M. Mann), [U.S.N.M.].

No data: 112♀, 20♂. [Various collections.]

Flower Records.—*Dicrophyllum marginatum, Sagittaria latifolia, Rhus copallina, Asclepias incarnata, A. verticillata, Gonolobus laevis, Aster ericoides, A. multiflorus, Baccharis emoryi, B. glutinosa, Eupatorium altissimum, E. perfoliatum, E. serotinum, Gutierrezia texana, Hymenopappus sulphureus, Rudbeckia triloba, Solidago canadensis, S. missouriensis, Leonurus Cardiaca, Mentha arvensis, Pycnanthemum flexuosum, P. pilosum, P. virginianum, Melilotus alba, Petalostemum candidum, Nelumbo lutea, Ludvigia polycarpa, Eriogonum fasciculatum, Polygonum* *lapathifolium, Gonopyrum americanum, Cephalanthus occidentalis, Cicuta Curtissii, C. maculata, Daucus carota, Eryngium yuccifolium, Sium cicutaefolium, Lippia wrightii, Verbena* sp., *Cissus arborea, Symphoricarpos orbiculatis, Mirabilis jalapa, Clethra alnifolia, Nerium Oleander, Persea gratissima.*

Myzine dubiosa Cresson (Text-figs. 1 and 10.)

1872. *Myzine dubiosa* Cresson, Trans. Am. Ent. Soc., IV, p. 200. [♀.]
1872. *Myzine texana* Cresson, Trans. Am. Ent. Soc., IV, pp. 200-201. [♀.] (New synonymy.)
1908. *Plesia fulvinervis* Cameron, Trans. Am. Ent. Soc., XXXIV, p. 239. [♀.] (New synonymy.)

Dubiosa is a very variable species so far as coloration is concerned. In most of the northern portions of its range the females are very similar to those of *maculata* but are distinguished by the lack of minute punctures on the pronotum and the more or less unicolorous forewings. In the southwestern portion of its range the females often have the yellow markings very much extended and are practically identical with *frontalis* females. The black antennae and slightly sparser pronotal puncturation usually distinguish the *frontalis* females but the best separation is based on the genitalia of definitely associated males. The Sikeston, Mo. and Rockmart, Ga. females are very much like tiny *obscura* females and I was unable to determine just what they were until I had studied the genitalia of the males taken on the same date.

The males also vary somewhat in the extent of the yellow markings, western specimens usually being more extensively maculated. However, in a lot of males from one particular locality having the transverse groove on the mesepisternum, those with the least amount of yellow will usually prove to be *maculata* and those with the greater amount *dubiosa.* When *frontalis* males are also present they have the greatest amount of yellow. Minute striae on the pygidium usually indicate *dubiosa* males. The genitalia readily identify *dubiosa* males; the short, stubby, three-sided inner clasper separates them from *maculata* and the much broader finger-like lobe of the outer clasper separates them from *frontalis.*

♀. 12-16 mm. long. Clypeus subopaque and covered with large well-separated punctures and numerous interspersed, minute punctures; front and vertex shining, the former with large well-separated punctures and the latter much more sparsely punctured; pronotum, mesonotum and scutellum shining with large well-separated punctures; postscutellum shining with several large punctures medianly and more numerous minute ones laterally; dorsal surface of propodeum opaque with several large punctures medianly and numerous minute ones laterally; posterior surface of the propodeum shining with several radiating striae (not at all prominent); mesepisternum shining with large well-separated punctures; lateral surfaces of propodeum subopaque with very fine oblique striae; abdomen shining, tergites one to five with numerous minute punctures.

Black; mandibles except apices, clypeus, antennae entirely, legs entirely except spots on hind coxae, and fore tibiae and femora, ferruginous (any of these may be black instead of ferruginous except the antennae which are usually tinged with reddish-brown ventrally); spot on clypeus laterally, frontal lobes confluent with broad bands on the inner margins of the eyes, band on temples reaching from the base of the mandible to a spot opposite the posterior ocellus (occasionally united on the vertex and also with bands on inner eye margins), large spot on antero-lateral corners of pronotal disk and occasionally a band on the posterior margin, tegulae except apices which are testaceous, elongate spot laterally and a large median spot on mesonotum, spot on antero-lateral corners and a larger median spot on scutellum, band on postscutellum, lateral band on posterior surface of propodeum and occasionally a central spot at the junction of that surface with the dorsal surface, large spot on mesepisternum below tegula and a smaller one above middle coxa, lateral spots on tergites one and two occasionally confluent medianly, basal bands on tergites three to five inclusive, occasionally there are lateral spots on only the first two or three tergites, lateral spots on sternites two and three and occasionally four, yellow; spot on hind coxa, apex of fore femur and a band on outer surface of fore tibia, yellow; wings hyaline, the forewings slightly infumated on the costal margin; venation testaceous.

♂. 12-15 mm. long. Clypeus shining with large close punctures; front shining and more closely punctured than the vertex; pronotum, mesonotum, scutellum and postscutellum shining and with large well-separated punctures, dorsal surface of propodeum shining with large punctures of first degree density; posterior surface of propodeum subshining with closer punctures and at times striato-punctate; mesepisternum shining with large punctures and a transverse carina below the tegula set off posteriorly by a groove; lateral surfaces of propodeum shining and striato-punctate; abdomen shining, tergites one to six inclusive with numerous minute punctures; pygidium shining with several large scattered punctures and usually several fine longitudinal striae cephalad of the emargination.

Black; mandibles except apices, clypeus, spot on frontal lobes, scape beneath, band on inner eye margins extending to the emargination, usually a spot behind the posterior ocelli, bands on anterior (usually interrupted medianly and extending down on the propleura) and posterior margins of pronotal disk, tegulae except apices which are testaceous, small lateral and large median spots on mesonotum, spot on scutellum, band on postscutellum, lateral spot on posterior surface of propodeum usually emarginate antero-laterally, large spot on mesepisternum below tegula and a smaller one above middle coxa, apical bands on tergites one to six inclusive usually emarginate medianly on the anterior margin, lateral spots on sternites two to six inclusive occasionally confluent medianly on the apical margin of the segment, yellow; anterior surface of fore coxa, spots on middle and hind coxae, all femora apically, all tibiae outwardly and all tarsi except apical joints of middle and hind tarsi, yellow; wings hyaline, the apices of the forewings slightly infumated; venation testaceous.

Type.—♀; Texas, (Belfrage), [Academy of Natural Sciences at Philadelphia, Type no. 577].

The holotype of *Myzine texana* Cresson, a female from Comal County, Texas, is also in the Academy of Natural Sciences (Type no. 578). The holotype of *Plesia fulvinervis* Cameron, a female from Berkeley County, Colorado (Oslar), is in the British Museum (Natural History).

I have examined the types of *dubiosa* and *texana* and find that they belong to the same species. The puncturation is the same in both specimens and the only differences are in the color pattern as follows: *texana* has a band on the vertex confluent with the bands on the inner eye margins while *dubiosa* has only a central spot behind the ocelli which is not connected with the bands along the inner eye margins; the pygidium of *dubiosa* is entirely ferruginous while that of *texana* is red only at the apex. These color variations are of no significance as I have seen specimens having a ferruginous pygidium and a band on the vertex confluent with the bands along the inner eye margins. At my request, Mr. J. F. Perkins of the British Museum (Natural History) has kindly compared a *dubiosa* female I sent him with the type of *fulvinervis* (Cam.) described from Berkeley County, Colorado (Oslar). He writes that the specimen sent agreed very well with the type of *fulvinervis* except that the latter has the yellow markings of greater extent.

Specimens examined: 193♀ and 419♂.

GEORGIA: 2♀, 1♂, Rockmart, July 4, [P.W.F.].

FLORIDA: 9♀, 1♂; Pensacola, Miami, Orlando, Enterprise, Jacksonville, Palm Beach, Fl[orid]a; May-Nov. 3; [A.M.N.H., U.S.N.M.].

ILLINOIS: 8♀, 7♂; Bath, Grand Tower, Meredosia, Havana; June 27-Aug. 30; [I.N.H.S.].

KENTUCKY: 1♀, East Cairo, Sept. 27, [I.N.H.S.].

ALABAMA: 5♀, 1♂; Ala[bama], Delchamps; July 19; [U.S.N.M., A.M.N.H.].

LOUISIANA: 2♀, 2♂; East Point, Orange; Aug. 23-Oct. 7; [U.S.N.M.].

TEXAS: 32♀, 138♂; Bastrop County, Lee County, Brazos County, Big Bend Park (Brewster Co.), Liberty, Fabens, Katherine, Victoria, Barstow, Clyde, Metz, Rosser, Paris, Calvert, San Antonio, Midland, Galveston, Donna, Presidio, Wilson County, McDade, Carrizo Springs, Cypress Mills, Sarita, Richmond (Brazos River), Bexar County; May 28-Dec. 1; [C.U., U.S.N.M., K.S.C., T.A.M., J.E.G., H.B.P., I.N.H.S., A.N.S.P.].

OKLAHOMA: 4♀; Ardmore, Tuskahoma; July 11-Sept. 15; [U.S.N.M.].

MISSOURI: 2♀, 1♂, Sikeston, [U.S.N.M.].

KANSAS: 71♀, 38♂; Dickinson, Dickinson County, Baldwin, Hamilton County, Manhattan, Phillips County (1940 ft.), Rooks County (1775 ft.), Pratt County (1900 ft.), Seward County (2600 ft.), Sherman County (3690 ft.), Graham County (2130 ft.), Cheyenne County (3300 ft.), Kingman County (1516 ft.), Douglas County, Reno County, Harvey County, Riley County; June 27-Sept. 21; [U.S.N.M., C.U., K.U., K.S.C.].

NEBRASKA: 4♀, 2♂; Niobrara (Knox Co.), Glen (Sioux Co.), Agate (Sioux Co.), Omaha (Douglas Co.); July 14-Aug. 20; [U.N.].

COLORADO: 3♀, 7♂; Roggen, S[outh] E[ast] of Prowers, Wray (3700 ft., about 40° 0′ N[orth], 120° 10′ W[est], Colo[rado]; July 29-Sept. 9; [C.H., U.C., A.M.N.H., A.N.S.P.].

NEW MEXICO: 3♀, 36♂; 10 mi[les] E[ast] of Deming, Albuquerque, Magdalena Mts., Magdalena, Arroyo Pecos River, Aden, Las Cruces, Mesilla, Rincon, El Rito, White Oaks, N[ew] M[exico]; June 30-Sept.; [C.U., K.U., A.N.S.P., U.S.N.M.].

ARIZONA: 19♀, 53♂; Palmerlee, Congress Junction, Mesa, Tucson, Hassayampa (Maricopa Co.), Tempe, Fort Grant (Pinaleno Mts.), Wickenberg, Sacaton, Douglas, Phoenix, Florence; May 12-Nov. 1; [U.N., K.U., U.A., K.S.C., U.S.N.M., C.U., A.N.S.P.].

MEXICO: (Baja California). 17♀, 17♂; Las Parras, between San Jose del Cabo and Triunfo, L[ower] Cal[ifornia], (San Jose del Cabo); Oct.; [U.S.N.M., A.N.S.P.].

No data: 12♀, 1♂, [I.N.H.S., H.B.P.].

Flower Records.—*Rhus* sp., *Baccharis salicina, Eupatorium serotinum, Gutierrezia texana, Helianthus* sp., *Vitex negundo, Cissus arborea, Melilotus alba, Chamaecrista fasciculata.*

Myzine frontalis Cresson (Text-fig. 9.)

1875. *Myzine frontalis* Cresson (*nec* Burmeister, 1876),[18] Rep't. Geol. & Geogr. Survey 100th Meridian, pp. 711-712. [♀.]

The species is quite variable in the extent of the yellow markings in both sexes. Normally both females and males have more extensive yellow markings than any of the other southwestern species. Occasionally the markings are somewhat reduced and both sexes resemble very closely the more extensively maculated variations of *dubiosa*. The short stubby, three-sided inner clasper and comparatively narrow finger-like lobe of the outer clasper of the male genitalia distinguish that sex readily.

♀. 12-22 mm. long. Clypeus opaque with numerous minute and larger interspersed punctures; front shining with well-separated punctures; vertex shining with large sparse punctures; pronotal disk shining and with rather sparse large punctures; mesonotum shining and less punctured; scutellum shining and about as strongly punctured as the pronotum; postscutellum shining with several large punctures medianly and numerous minute ones laterally; dorsal surface of propodeum opaque with several large punctures medianly and numerous minute ones laterally; posterior surface shining with weak radiating striae; mesepisternum shining with large, sparse punctures; lateral surfaces of propodeum shining with fine oblique striae; abdomen shining, tergites one to five inclusive with well-separated minute punctures.

Black; broad band across frontal lobes confluent with bands along the inner eye margins, spot below anterior ocellus, band on temples from base of mandibles and reaching across the vertex and usually confluent with the band along the inner eye margins, spot on neck usually confluent with the broad spots on the pronotal disk which in turn are usually confluent medianly, tegulae except apices which are testaceous, elongate lateral and a large median spot on mesonotum, a spot on antero-lateral corners of scutellum and a larger one medianly, band on postscutellum, usually the entire propodeum, a large spot on mesepisternum below tegula which is frequently confluent with a smaller spot above the middle coxa, basal bands on abdominal tergites one to five inclusive which frequently extend over the entire segment, lateral spots on sternites two to four inclusive and occasionally five, lemon yellow; small spot on anterior coxa (usually absent), spots on posterior coxa, a spot apically on all femora, and a narrow line on the outer margin of the fore tibia, yellow; wings hyaline, the costal margin of the forewing usually slightly infumated; venation honey-yellow to testaceous.

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[18] **Myzine burmeisteri** new name

1876. *Myzine* (*Plesia*) *frontalis* Burmeister (*nec* Cresson, 1875), Stett. ent. Zeit., XXXVII, p. 177, no. 10. [♀.]

Burmeister's name is preoccupied and must sink. The species was described from Argentina.

♂. 9-20 mm. long. Clypeus opaque with large punctures; front and vertex shining, the former more densely punctured than the latter; pronotum, mesonotum, scutellum and postscutellum shining with well-separated punctures; propodeum shining and varying from closely to sparsely punctured on the dorsal surface and from striato-punctate to sparsely punctured on the posterior surface; mesepisternum shining with well-separated punctures and a transverse carina below the tegula with a posterior crenulate groove; lateral surface of propodeum shining and varying from sparsely punctured to minutely striato-punctate; abdomen shining, tergites one to six inclusive with numerous minute punctures; pygidium flat with a few scattered punctures and usually several minute striae at the apex cephalad of the emargination.

Black; mandibles except apices, clypeus, frontal lobes, scape beneath, band on inner eye margins extending to the emargination or up to the vertex where it is confluent with a band on the temples which reaches from the base of the mandibles to the top of the eye or occasionally across the vertex, practically the entire pronotal disk and most of the propleura, elongate lateral and larger median spots on the mesonotum, spot on anterolateral corners of the scutellum and a larger median one, band on postscutellum, propodeum varying from lateral stripes on the posterior surface to practically the entire segment, large spot on mesepisternum below tegula which is frequently confluent with a smaller spot above the middle coxa, abdominal tergites one to six inclusive with broad or narrow apical bands, occasionally lateral spots or a band on the pygidium, lateral spots on sternites one to six inclusive occasionally confluent on the apical margin (those of the first and sixth may be lacking), yellow; legs varying from entirely yellow except the trochanters to this condition; anterior surface of fore coxa, spots on middle and hind coxae, apical half of all femora, all tibiae externally and all tarsi, yellow; wings hyaline, the apices of the forewings very slightly infumated; nervures yellow to testaceous.

Type.— ♀; New Mexico, (Yarrow), [Academy of Natural Sciences at Philadelphia, Type no. 1895].

I have examined the type.

Specimens examined: 172♀ and 657♂.

TEXAS: 4♂, Big Bend Park (Brewster Co.), July 22; [J.E.G.].

KANSAS: 3♀, S[outh] of Coolidge, July 31, [U.C.].

COLORADO: 18♀; Boulder, (on *Polygonum* sp. and *Melilotus alba*), Fort Lupton, Roggen, Glenwood Springs (5800 ft., 39° 33′ N[orth], 107° 11′ W[est], Wray, Crowley, Holly, Drennan, Pleasant Valley, Colo[rado]; July 31-Sept. 15; [U.S.N.M., C.S.A.C., U.C., A.M.N.H., A.N.S.P.].

NEVADA: 1♀, 1♂; Glendale, (on *Pluchea sericea*), Nev[ada]; Sept 18; [U.S.N.M., A.N.S.P.].

NEW MEXICO: 28♀, 12♂; Mesilla Park, White Oaks, Gran Quivera, White Rocks, El Rito, Albuquerque, Rincon (on *Chilopsis saligna*), Deming (4300-4400 ft.), Las Cruces (on *Solidago canadensis arizonica*), N[ew] Mex[ico]; June 14-Sept. 11; [A.N.S.P., K.S.C., A.M.N.H., U.S.N.M.].

ARIZONA: 22♀, 435♂; Wickenberg, Bill Williams' Fork, Tucson, Globe, Phoenix, Douglas, Tempe, Florence, Sacaton, Gillespie Dam (Maricopa Co.), Kelton, Mesa, Ariz[ona]; June 1-Oct. 28; [C.U., K.U., U.S.N.M.; U.A., K.V.K., A.N.S.P., K.S.C.].

CALIFORNIA: 100♀, 206♂; Palm Canon (Colorado Desert, 1000 ft.), Owen's Lake, Littlerock (Mojave Desert), Redlands, Mojave Desert near Palmdale, Antelope Valley (Los Angeles Co.), Jacumba Springs (on *Eriogonum*), El Centro, Riverside (on *Eriogonum fasciculatum* and *Baccharis*), Lone Pine (Owen's Valley, Inyo Co.), Experimental Farm (Imperial Co., on *Baccharis glutinosa*), 15 mi[les] S[outh] of Indio, Cal[ifornia]; May-Sept. 26; [C.U., C.S.A.C., A.M.N.H., U.S.N.M., P.H.T., G.R.F., A.N.S.P.].

Myzine confluens Cresson

1865. *Myzine confluens* Cresson, Proc. Ent. Soc. Phila., IV, pp. 443-444, no. 3. [♀.]
1894. *Myzinc confluens* Fox, Proc. Calif. Acad. Sci., (2), IV, p. 95. [♀.]

The double yellow bands on the abdominal tergites distinguish this species at once. It is most closely related to the Argentine *gemellata* Burm. which has much the same color pattern.

♀. 12-14 mm. long. Clypeus with large punctures on the entire surface, and minute ones basally; front with large punctures, many of first degree density; vertex with large, separated punctures; pronotal disk with large punctures, many of first degree density; mesonotum and scutellum with large, well-separated punctures; postscutellum with a few large punctures medianly and some minute ones laterally; dorsal surface of propodeum opaque and with numerous minute punctures; posterior surface shining with a few, scattered minute punctures and several short, fine striae above the muscle insertion; mesepisternum with large well-separated punctures; lateral surfaces of propodeum with fine oblique striae; abdominal tergites one to six inclusive with numerous minute punctures.

Black; mandibles except apices, spot on lateral corners of clypeus, frontal lobes with an extended band reaching nearly to the anterior ocellus, band on inner margins of eyes extending slightly above the eyes, band on temples extending from the mouth parts to spots opposite the posterior ocelli, broad bands on the anterior (extending down on the propleura) and posterior margins of the pronotal disk, tegulae except apices which are testaceous, small lateral and large median spots on mesonotum, small spot on antero-lateral corners of scutellum and a larger median spot, band on postscutellum, large median mark on dorsal surface of propodeum extending down over half the posterior surface, posterior surface additionally with a lateral spot which extends forward covering almost the entire lateral surfaces, large spot on mesepisternum below the tegula and a smaller one above the middle coxa, a broad band on the first abdominal tergite emarginate before and behind medianly, basal and apical bands on tergites two to five inclusive and broadly confluent laterally (the basal bands on the fourth and fifth and the apical band on the second interrupted medianly), second and third sternites with large lateral spots anteriorly and narrow bands apically, fourth sternite with lateral spots, yellow; spot above on hind coxa, apices of all femora, and narrow lines on fore and middle tibiae outwardly, yellow; all tarsi, the fore and middle tibiae (except for the yellow lines), the hind tibia entirely, and the flagellum dully, ferruginous; wings hyaline, the anterior margins of the forewings slightly infumated; venation testaceous.

♂. Unknown.

Type. — ♀; mountain region of Colorado Territory, 1864, (Ridings), [Academy of Natural Sciences of Philadelphia, Type no. 573].

Specimens examined: 4♀ (including the type).

COLORADO: 1♀, mountain region of Colorado Territory, 1864 (James Ridings) [*holotype*, A.N.S.P.].

MEXICO, (Baja California): 3♀, L[ower] Cal[ifornia], between San Jose del Cabo and Triunfo, [A.N.S.P., A.M.N.H.].

Myzine spilonota (Cameron) (Text-fig. 12.)

1908. *Plesia spilonota* Cameron, Trans. Am. Ent. Soc., XXXIV, p. 240. [♀.]

The males which I have associated with this species may not belong here but *spilonota* and *confluens* are the only species from the southwest with which males have not been definitely associated. Since *confluens* has not been taken in Arizona I have placed these males in *spilonota*. The short flat lobe of the inner clasper which is rounded at the apex distinguishes them from other males occurring in the southwest. The females are easily separated by the coarse puncturation of the pronotal disk with the punctures arranged in longitudinal rows.

♀. 13-18 mm. long. Clypeus shining, the surface with large punctures and basally with some minute ones; front shining and coarsely punctured; vertex shining with large, sparser punctures; pronotal disk with coarse punctures of second degree density mostly; mesonotum and scutellum shining with large scattered punctures; postscutellum shining with several large punctures medianly and numerous minute ones laterally; the posterior surface of the propodeum shining with weak radiating striae; mesepisternum shining with large punctures many of the first degree density; lateral surfaces of propodeum shining with oblique striae; abdomen shining, tergites one to three inclusive with scattered, minute punctures, tergites four and five with larger, closer punctures; sternites with long, glittering white hairs.

Black; band on inner margins of eyes, minute spot before anterior ocellus occasionally, spot on antero-lateral corners (occasionally confluent medianly) and occasionally a median spot on the posterior margin of the pronotal disk, elongate spot on postero-lateral corners and a larger median spot on the mesonotum, lateral and median spots on scutellum either of which may be absent, band on postscutellum, median spot on dorsal surface of propodeum which occasionally is confluent with the lateral bands on the posterior surface, which in turn may be confluent posteriorly with the spots on the lateral surfaces, large spot on mesepisternum below the tegula, abdominal tergites one to five banded apically and emarginate posteriorly, occasionally those on the first, second and fifth may be separated medianly, lateral spots on sternites two and three which may be absent, and a spot on the posterior coxa, yellow; wings hyaline, the costal margin of the forewings strongly infumated; venation dark brown to testaceous.

♂ (hitherto unrecognized). 15-17 mm. long. Clypeus shining and closely punctured; front shining, more closely and coarsely punctured than the vertex; pronotum, mesonotum, scutellum and postscutellum shining with large, well-separated punctures; propodeum shining and striato-punctate; mesepisternum shining with large punctures and occasionally a transverse groove below the tegula; abdomen shining with numerous fine punctures; pygidium shining with a few large punctures and some fine, longitudinal striae cephalad of the emargination.

Black; mandibles except apices, clypeus, spot on scape beneath, frontal lobes, inner eye margin to emargination, spot behind posterior ocelli, anterior (interrupted medianly in some and extending down on the propleura) and posterior margins of the pronotal disk, tegulae except apices which are testaceous, a small spot on postero-lateral corners of mesonotum and a large median spot, spot on scutellum, band on postscutellum, an elongate lateral spot on posterior surface of propodeum emarginate laterally, large spot on mesepisternum below tegula and a smaller spot above middle coxa, apical bands on tergites one to six inclusive, those of first to third emarginate medianly on the anterior margin, the fourth to sixth emarginate laterally on the anterior margin, those on the sixth separated medianly, and elongate transverse spots on apices of sternites two to six inclusive, yellow; spot on posterior coxa, apices of all femora, entire outer surface of fore and middle tibiae, line on base of hind tibia outwardly, and all tarsi except the apical joints, yellow; wings hyaline, the forewings with dusky apices; venation testaceous.

Holotype.—♀; Gallinas County, New Mexico, (Oslar), [British Museum (Natural History)].

Spilonota was described from a female (females?) from the Baker collection. I have examined several females in the Cornell University collection (originally in the Baker collection) bearing the same data as the type and find that they agree with Cameron's description. Possibly these should be considered as paratypic material since Cameron was not in the habit of labeling all specimens in the type series.

Specimens examined: 94♀ and 7♂.

TEXAS: 3♀; Canon behind Pulliam Bluff (Chisos Mts., 4600-5000 ft.), Jefferson, Big Bend Park (Brewster Co.); Aug. 7-Sept. 7; [A.N.S.P., U.S.N.M., J.E.G.].

COLORADO: 8♀; La Junta, Durango, San Miguel, Boulder (on *Polygonum*), Colo[rado]; July 27-Sept. 12; [A.M.N.H., I.N.H.S., U.C., U.S.N.M.].

UTAH: 7♀; Pine Valley Mts. (Washington Co.), Aspen Grove (Brigham Young University Campus, Timpanogas), Ut[ah]; Sept.; [U.S.N.M., C.U., B.Y.U.].

NEW MEXICO: 9♀; Gallinas Canon, La Cueva (Gallinas River), Organ Mts. (La Cueva), Las Vegas, Glorieta; July 29-Sept. 28; [C.U., U.C., U.S.N.M., A.N.S.P.].

ARIZONA: 64♀, 7♂; Douglas, Tucson, Coyote Mts., Sabino Basin (Santa Catalina Mts.), Huachuca Mts., Nogales, Southern Arizona, Oak Creek Canon (6000 ft.), Sierra Ancha Mts., Ariz[ona]; July 14-Oct. 13; [U.S.N.M., U.A., U.M., C.U., K.U., K.V.K., A.N.S.P.].

No data: 2♀, [C.S.A.C., C.U.].

SPECIES INCERTAE SEDIS

The following species have not been included in the body of the revision for various reasons as noted under the discussion of each. I have not included the original descriptions here since most of these species are based on color characters which might apply to more than one species.

Myzine sexcincta var. **affinis** Guérin

1837. *Myzine sexcincta* var. *affinis* Guérin, Dict. pitt. hist. nat., v, pp. 580-1. [♀.]

After his description of *sexcincta* (Fabr.) Guérin lists some six varieties one of which is *affinis* Guér. These varietal names are not accompanied by descriptions or any other data and must be considered *nomina nuda*. The other three Guérinian names listed here are some of the varieties included and the same remark applies to them also.

Myzine sexcincta var. **apicalis** Guérin

1837. *Myzine sexcincta* var. *apicalis* Guérin, Dict. pitt. hist. nat., v, pp. 580-1. [♂.]

Myzine marginata (Say)

1823. *Plesia marginata* Say, West. Quart. Rept., II, p. 75. [♀.]

This species may be the same as *frontalis* Cress. and some workers have named as *marginata* specimens of *frontalis*. Say states that the abdomen is yellow with the tergites having apical black margins. However, I hesitate to adopt this name in preference to *frontalis* when the type of *marginata* is no longer in existence.

Myzine sexcincta var. **menechma** Guérin

1837. *Myzine sexcincta* var. *menechma* Guérin, Dict. pitt. hist. nat., v, pp. 580-1. [♂.]

Fedtschenkia nigropilosella (Cameron)

1908. *Plesia nigropilosella* Cameron, Trans. Am. Ent. Soc., XXXIV, p. 237. [♀.]

Another of the glaring taxonomic errors committed by Cameron. Mr. Robert Benson of the British Museum (Natural History) informs me that the type of *Plesia nigropilosella* Cam. has been placed in the genus *Fedtschenkia* Radosz. by Mr. Rowland E. Turner. The species may not be placed in the correct genus but it is undoubtedly a Sapygid and probably will prove to be conspecific with *Telephoromyia anthracina* Ashmead.

Myzine sexcincta var. **obscuripennis** Guérin

1837. *Myzine sexcincta* var. *obscuripennis* Guérin, Dict. pitt hist. nat., v, pp. 580-1. [♂.]

Myzine serena (Fabricius)

1805. *Tiphia serena* Fabricius, Syst. Piez., p. 234, no. 10. [♀.]

This will probably turn out to be one of the more extensively maculated females of *maculata* (Fabr.) since the description checks with some of these females and *serena* is supposed to be smaller than *namea* (Fabr.). Otherwise, *serena* might be the same as *quinquecincta* (Fabr.) so I have refrained from entering it under the synonymy of *maculata*.

18-3-39

THE NERIIDAE AND MICROPEZIDAE OF AMERICA NORTH OF MEXICO

(DIPTERA)

BY EZRA T. CRESSON, JR.

(Plates XI to XIII, and text-figure)

The preparation of this paper was prompted by the many requests for identifications of North American material and the fact that our species of these families have never been comprehensively treated.

Several years ago I became interested in these families of Diptera as an alternative study with the smaller Ephydridae, particularly to work with during the warm and humid summer months. In the course of these studies I had published several papers on their genera and species but since the publication of my "Notes on and Description of Some Neotropical Neriidae and Micropezidae"[1] was compelled to lay them aside. However, during those studies I had drafted descriptions and made copious notes on the material then at hand. These, amended and elaborated by studies on collections since received for identification and borrowed for the present work, are the foundation of this revision.

In my 1930 paper a brief review of the work done by others in this family was given and that paper might well be consulted by those interested. Since then the family Micropezidae as regards the American species has been summarily treated by Dr. Willi Hennig in his "Revision der Tyliden",[2] a very valuable contribution and indispensible to students of the Micropezidae.

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[1] Trans. Amer. Ent. Soc., LVI, pp. 307-362 (1930).

[2] Stet. Ent. Zeit., xcv, pp. 65-108, 294-330, (1934); xcvi, pp. 27-67, (1935); Konowia, xv, pp. 129-144, 201-239, (1936).

Acknowledgments.—During my studies in these families, material totalling 1596 specimens has been examined from many individuals and instiutions without whose cooperation and generosity I would not have been able to give as complete a treatise as is here offered. In consequence I am greatly indebted to the following, for the loan of their own collection or that of the institution with which they are or were connected. The abbreviation or symbol given within brackets is that used in the list of specimens examined, denoting such sources.

The Academy of Natural Sciences of Philadelphia, [A.N.S.]; Dr. Charles F. Adams, [Adams]; The American Museum of Natural History through Dr. Frank E. Lutz and Dr. C. H. Curran, [A.M.N.H.]; Dr. Jos. Bequaert, [Beq.]; United States Biological Survey, Mr. W. L. McAtee, [Biol.]; Mr. Henry Bird, [Bird]; The Boston Society of Natural History, through the late Dr. Chas. W. Johnson, and Mr. Richard Dow, [Bost.]; Dr. Stanley W. Bromley, [Bromley]; California Academy of Science, Mr. E. P. Van Duzee, [Cal.]; Canada Department of Agricultura, Dr. James McDunnough, [Can.]; Colorado Agricultural College, Mr. Maurice T. James, [Col. A.]; Cornell University, Dr. J. Chester Bradley, [C. U.]; Illinois Natural History Survey, Dr. T. H. Frison, [Ill.]; Dr. Frank M. Jones, [Jones]; University of Kansas, Dr. R. H. Beamer, [Kans.]; Kansas Agricultural College, Mr. C. W. Sabrosky, [Kan. A.]; Dr. A. L. Melander, [Mel.]; Michigan Agricultural College, Mr. C. W. Sabrosky, [Mich. A.]; University of Minnesota, Dr. Clarence E. Mickel, [Minn.]; Museum of Comparative Zoology, Dr. Nathan Banks, including the collections of Dr. C. W. Johnson and Dr. Banks, [M.C.Z.]; Dr. Reginald H. Painter, [Painter]; Mr. Curtis W. Sabrosky, [Sab.]; South Dakota Agricultural College, Dr. H. C. Severin, [S. D.]; United States National Museum, the late Dr. J. M. Aldrich, [U. S.]; Utah Agricultural College, Dr. Geo. F. Knowlton, [Utah].

Explanation of terms used.—In the study of this family, the unusual development of the sclerites of the head made necessary the adoption of several terms not generally used in dipterological taxonomy, and also made an apparent change in the meaning of several well understood terms. It has not been necessary, however, to create new terms, but the application of those I use may not in all cases be that as originally proposed, nor be familiar to most students. Consequently a brief explanation of these are here given, particularly those referring to the areas of head.

I have used the term *occiput* to refer to the entire region of the head posterior to the eyes; here we have the *paracephala* (singular, *paracephalon*) as the lateral portions of the occiput bordering the posterior orbits, and bearing the outer vertical bristles on their upper portion. This portion of the head is greatly developed in the genus *Micropeza.* Above and mesad of the paracephala and bearing the inner verticals and the posterior pair of frontal bristles, are the *epicephala,* which generally occupy the lateral angles of the vertex,[3] and extending posteriorly to the foramen, and anteriorly as the *frontalia,* from which they are usually indistinctly differentiated. The latter (frontalia) are often very narrow or may be indeterminable, being in evidence only by the presence of the *anterior frontal bristles.* Between the epicephala and the frontalia may be seen the *mesofrons* as a comparatively broad or narrow, often fusciform, opaque, median stripe, including the *ocelli,* and extending more or less the entire length of the frons; most marked in the Taeniapterinae. Laterad of the mesofrons anteriorly are the *parafrons,* but not always differentiated, occupying the lateral anterior portion of the frons, generally extending posteriorly along the orbits to near the vertex. Of the scletites and parts of the thorax, I will mention only a few which may not be familiar to all students of this order. The *propleural scale* is the scale like development of the propleura projecting cephalad above the foramen, and beneath the foramen at its base will be seen the more or less developed *cervical.* The antesutural portion of the mesonotum is the *proscutum* while the *scutum* is that portion caudad of the transverse sutural region. At the caudal margin of the sternopleura, particularly in the Taeniapterinae is a series of long bristles, termed the *sternopleural comb*. The *pterostigma* is that portion of the subcostal cell between the apices of the subcosta and the first vein.

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[3] The term vertex in these families is not always definitely limited enough to use, but is here used to indicate that portion of the head between the eyes, including the vertical bristles.

All measurements of the length of the insect, include the genitalic segments of the males but excludes the two ovipositor segments of the females.

Ethology.—Apparently very little is known of the early stages and habits of the species of these families. Robineau Desvoidy states that the larvae live in the stems and leaves of herbaceous plants; and other students have observed their occurrence in decaying stems and fungi. From labels accompanying material I have examined, specimens of the Neriidae have been secured from rotten pulp of *Cereus*, trunks of rotten papaya trees and rotten calabash, in Panama; and in Australia a species is known as the " banana stalk-fly ". Pupae of *Taeniaptera lasciva* (Fab.), in Porto Rico, were reared from [sugar] " canes of cuttings that had failed to germinate and were in decaying condition ". A very interesting account is given by Dr. W. M. Wheeler[4] of the courtship of a Neotropical species.

In a note accompaning his description of *Micropeza turcana*, Dr. C. H. T. Townsend states that " The insects were found somewhere near the center of a large open stretch of meadow-like country . . . and were evidently flying, as they came in the wagon. . . . They occurred for some distance as we drove along the road, probably for a mile or so, and not a specimen was seen at any other place during the whole trip . . . but on our return [several weeks later] while traveling along the same road, we found the same fly in numbers comming into the wagon at . . . the very same place. . . . It is quite probable that the present species breeds in the stems of some plants, most likely a grass, but this does not explain its restricted occurrence in such numbers. Such a breeding habit would be indicated by the ovipositor."

Characteristics.—The species constituting these families are conspicuous by their slenderness, long delicate legs and the convergence of the third and fourth veins of the wings. The shape of the head is very variable, ranging from extremely conoid to

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[4] Jour. Heredity, xv, pp. 485-490, (1924).

spheroid, or sublenticular; eyes never contiguous except apparently, as the result of shrinkage after death. Normally the inner and outer verticals and one or more frontals are present, but the ocellars, vibrissae and distinct facials are absent. The clypeus is usually well developed and broadly visible; antennae variable. Thorax usually elongate, rather subconoid anteriorly, usually with one or two dorsocentrals, a presutural, a supra-alar, a postalar, one or two notopleurals and two scutellars. Abdomen slender, the post-abdomen of males often very much enlarged, with a complicated genitalic assemblage, of which a conspicuous clasping organ, a modification of a sternite, is distinctly separated from the genitalic segments. Wings sometimes distinctly banded, with subcosta complete; first posterior cell attenuated apicad; anal cell present. Legs long and slender without (except in the Neriidae) strong bristles, but often with series of extensor setulae on mid and hind femora and tibiae; no preapical tibial spur.

Family NERIIDAE

This family is circumtropical in distribution, with a few of its species ranging beyond the apparent limits of such influence. The species here treated ranges from Costa Rica northward to just within the southwestern border of the United States, and consequently is included in the present paper.

The species of this family are easily recognized by their slender build, porrect position of the antennae, the second segment of which has a finger-like prolongation lying in a groove on the inner side of the third; the arista is apical or subapical. The thorax is considerably prolonged beyond the fore coxae, the fore coxae also quite removed from the middle ones. The male genitalia are external, with the clasping organ inconspicuous, subterminal on an ovipositor-like segment which can be folded cephalad against the venter.

There are several groups of genera which possibly deserve subfamily recognition, but the genus here treated falls in the one that may well be termined the Neriinae.

ODONTOLOXOZUS Enderlein

1922. *Odontoloxozus* Enderlein, Arch. f. Naturg., LXXXVIII, A, p. 158.

This genus was proposed for the reception of a new species from Mexico, *Odontoloxozus punctulatus*, which however proves to be a synonym of *Nerius longicornis* Coquillett, and, so far as known to me, is the only species belonging to this genus.

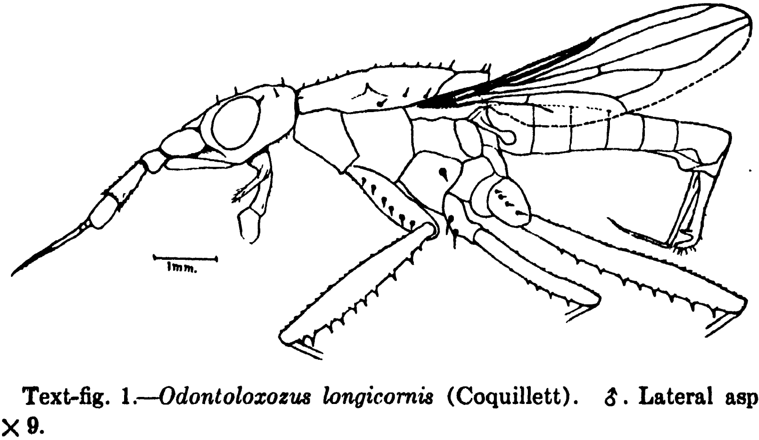
The third antennal segment is broad apically, with white pubescent arista; thorax with numerous stout spinules situated on brown dots, giving an irrorated appearance; femora strongly spinose beneath; posterior crossvein very oblique, subparallel with the inner margin.

Odontoloxozus longicornis (Coquillett) (Text-fig. I.)

1904. *Nerius longicornis* Coquillett, Proc. Ent. Soc. Wash., VI, p. 188.
1922. *Odontoloxozus punctulatus* Enderlein, Arch. f. Naturg., LXXXVIII, A, p. 158. (Syn. by Cresson 1930.)
1930. *Odontoloxozus longicornis* Cresson, Trans. Amer. Ent. Soc., LVI, p. 313.

This species is easily recognized by the characters given of the genus.

Length: 7 to 12 mm.



Text-fig. 1.—*Odontoloxozus longicornis* (Coquillett). ♂. Lateral aspect. × 9.

Distribution.—This species occurs from Texas to California southwards to Costa Rica. Originally described from two males and twelve females from San Diego and Brownsville, Texas;

Tucson, Arizona; and Los Angeles County, California. The type is a male from San Diego, Texas, [U.S.N.M., no. 7781].

It is known to me from the following:

Specimens examined: 56.

CALIFORNIA: Los Angeles Co., Los Angeles (Clark), [Bank's Colln., M. C.Z., 1♂]: (Coquillett), [U.S.N.M., 5].

ARIZONA: All (R. H. Beamer) and [Kans., 6♂, 3♀] except as otherwise noted. Pima Co.—Baboquivari Mts., VII 19: Tucson, II, VI 18, (H. Osborn; from rotten pulp of *Cereus*), [U.S., 1]. Santa Cruz Co.—Santa Rita Mts., VI 12, VII 17. Yavapai Co.—Prescott, VII 29.

Sabino Canyon, VI 22, VII 12, (R. H. Beamer), [Kans., 3♂, 2♀]. Ash Creek, Graham Mts., VI, (E. G. Holt), [Biol., 1].

TEXAS: Duval Co.—San Diego, V, (E. A. Schwarz), [U.S., 2♂, 2♀]. Cameron Co.—Brownsville, V, (C. H. T. Townsend), [U.S., 1]: VI-VII, [Kans., 26].

Point Isabel, II 5, (H. S. Parish), [U.S., 2].

Family MICROPEZIDAE

As distinguished from the Neriidae, the members of the Micropezidae have the third antennal segment decumbent, without the mesal finger on the second; arista subbasal; prothorax retracted while the mesothorax is extended, so that the fore and mid coxae are widely separated; the male genitalic assemblage is radically different, in that the claspers, when present are separately developed and distinctly removed basad from the genital segments and are greatly enlarged in some of the Calobatinae.

The species easily arrange themselves into three groups which are here treated as subfamilies: Micropezinae, Calobatinae and Taeniapterinae. In the first two groups the genera are weak, the species not offering very marked generic characteristics, but in the Taeniapterinae we have comparatively little trouble in establishing their limitations.

These subfamilies may be separated as follows:

1. Frons rather uniform in sculpturing, without well marked areas, usually entirely opaque or shining; the parafrons and mesofrons scarcely differentiated; ocelli situated well caudad; antennae approximate; male genital segments more or less turgid; claspers variable, sometimes greatly developed; ovipositor segment robust and variously shaped; sternopleural comb at most consisting of one or two hairs or bristles 2

Areas of frons well marked, the parafrons well defined cephalad and usually well differentiated from the generally opaque mesofrons; ocelli situated near middle of mesofrons; antennae well separated at bases; sternopleural comb composed of several to many bristles; genital segment comparatively inconspicuous, more or less awl-like; claspers rather uniform in shape situated near genital segments; ovipositor segment usually slender, awl-shaped ....Taeniapterinae

2. Second basal crossvein present; frons uniformly opaque; hind tibiae without extensor setae ....Calobatinae

Second basal crossvein absent; frons shining; hind tibiae with extensor setae ....Micropezinae

Distribution.—Of this family about eighty-nine per cent of the species are Tropical in distribution, and more than half of these are in the New World. Hennig[5] gives fifteen Nearctic species. I am recognizing twenty-six in the present revision but all these are not truly Nearctic.

The geographical limits considered in this revision are the Atlantic coast, on the east, the Gulf of Mexico and northern boundary of Mexico on the south and the Pacific coast on the west. These limits on the south naturally compels me to consider a few species which are typically Neotropical. Within this area we find the Micropezinae confined for the most part to the western portion, its species ranging from Mexico to Central and Eastern Canada; the Taeniapterinae we find only in the eastern portion, ranging from Florida and Texas to Canada. It is in these groups that we find several Neotropical species coming within our limits. The Calobatinae on the other hand is confined to the northern portion, its species ranging across the continent practically north of the 30th parallel of latitude.

Subfamily MICROPEZINAE

1922. Micropezinae Enderlein, Arch. f. Naturg., LXXXVIII, A, p. 159.
1930. Tylinae Czerny, Lindner's Fl. Pal. Reg., fam. 42, p. 2.
1934. Tylinae Hennig, Stet. Ent. Zeit., XCV, p. 68.

We may consider the species constituting the old genus *Micropeza* as representing a subfamily, distinct from those of the

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[5] Konowia, XV, p. 231, (1936).

old genera *Calobata* (not of authors) and *Taeniaptera* (*Tanipoda* of some authors). As distinguished from the Calobatinae and the Taeniapterinae, the members of this subfamily are comparatively small, rarely ranging over seven millimeters in length, excluding the ovipositor segments; slender in thorax and abdomen and with long slender legs; the head on the other hand is quite variable, in all intergrades from elongate conoid to obliquely subspherical. Our species, however, as far as known, have the head distinctly conoid, much longer than high. The following may be considered the principal characteristics of the subfamily:

Subfamily diagnosis.—Head, in profile, orbicular to elongate conoid; the paracephala often very greatly developed caudad, turgid (Fig. 2), frons without well marked mesofrons or parafrons; without bristles except the usual inner-, outer- and post-verticals. Face receding, almost horizontal; the parafacies apparently extending for some distance dorsad of the antennal line. Antennae short; third segment rather rotund, with arista dorsal. Thorax, in profile, obliquely long and slender, the proscutum as long as the scutum; propleura bare, a supra-alar, a post-alar, one to two notopleurals, two scutellars, one sternopleural, present.

Abdomen very long and slender; the six tergites constituting the preabdomen vary but little in shape, the fused first and second being the longest, those following are more or less quadrate; tergites VII to IX constituting the postabdomen are greatly modified in the male, particularly VIII and IX, while VII is reduced to a sinstral sclerite or is apparently obsolete and crowded out by the enlarged globose more or less fused VIII and IX; at the ventral extremity of IX are the styli and aedeagus. Sternities I to IV are usually chitinized and discernable; V in some species is modified into a clasping organ (claspers); VI is variable in shape, sometimes deeply cleft to base or modified into a part of the copulating assemblage; VII to VIII are so involved and modified that I have not attempted to indicate them. They appear to be the more or less developed sinstral sclerites apicad and ventrad of tergite VI.

Legs very long and slender, their tibiae with distinct series of extensor setae.

The genitalia itself is not considered in this paper except in a few instances when the styli are conspicuous and noteworthy. However, a study of these organs will no doubt give additional specific characters that are greatly needed in this subfamily. The fifth sternite, when modified into a clasping organ, is produced free from the venter (Fig. 2), its lateral margins folded caudad, and apically produced into more or less conical or filiform processes which in opposition to each other, form the true claspers. Many modifications of these organs are found, and in a few species are absent.

In size the species of this subfamily range from four to seven millimeters in length.

Genera of the subfamily.—The variation in the shape of the head in this family is remarkable, and to a less extent, the convergence of the third and fourth veins. Of the former I have seen all gradations from elongate-conoid to obliquely ellipitical having the vertical height greater than the horizontal length; and as regards the veins I have seen the first posterior cell open for a distance equal to the length of the anterior crossvein, gradating to closed and with a petiole of similar length. In several individuals I have seen this cell open in one wing and petiolate in the other. The head is generally more elongate in the females.

The extreme differences in the shape of the head and in the venation have been used as characters for the erection of several genera. Just how much they can be thus utilized must await exhaustive study of much material. In my study, based on considerable Neotropical material, I found most of these proposed genera to be practically untennable as originally characterized, but it is probable that some of their names will be available for groups based on other characters. After considerable study of these "other characters" I have been able to recognize, in our species, two, at least workable groups which I am recognizing as genera: *Micropeza* and *Neriocephalus.*

Besides the above mentioned, there is *Cryogonus* Cresson, 1936, erected for *Micropeza formicaria* Rondani, of South America, characterized by having a distinct dorsocentral (postsutural), and the second vein unually short.

In 1932 Hendel erected *Neotypus,* a subgenus of *Micropeza,* for those species allied to *Micropeza brasiliensis* Schiner, 1868, having a series of extensor setulae on the mid and hind femora. The weakness of this group I discuss under *stigmatica.*

Key to the Genera of the Subfamily Micropezinae

A postsutural dorsocentral bristle present; second vein short. (Neotropical) .... *Cryogonus* Cresson
No dorsocentral present; second vein long
  Two notopleural bristles present; first posterior cell closed and usually petiolate .... *Neriocephalus* Enderlein
  One notopleural present; first posterior cell open or closed at margin. *Micropeza* Meigen

Distribution.—The species of this subfamily are known only from the Palaearctic, Neotropical and Neartic regions. Hennig gives, of the sixty-one species known to him, twelve Palearctic, six Nearctic and forty-three Neotropical. I am recognizing thirteen species occuring north of Mexico.

MICROPEZA Meigen

1800. *Tylos* Meigen. Nouv. Classif., p. 31. (Nom. nud.)
1803. *Micropeza* Meigen, Illig. Mag., II, p. 276.
1908. *Tylos* Hendel. Verh. Zool.-Bot. Gessel. Wien, LVIII. p. 60.
1922. *Micropeza* Enderlein, Arch. f. Naturg., LXXXVIII, A, p. 159.

The North American species of this genius are easily recognized by the long slender conical head. In this they simulate the species of the Neriddae, differing, however, in having the arista dorsal and basad, and the second basal and discal cells united. From those of the genera of the other subfamilies, Calobatinae and Taeniapterinae, the species of the present genus are distinguished by lacking the basal cross vein, and, as regards the North American species, in having the elongate, conical head.

The species of this genus occurring within the limits of the present treatise have the head, in profile, distinctly trigonal, about one and one-half times as long as high, the paracephalon much developed caudad; thorax much lenghtened and attenuated cephalad; the mid and hind coxae very close together, far removed caudad from the fore ones; antennae short, third segment rather discoidal with dorsal, basal arista; one notopleural, one supra-alar, one postalar, and one or more bristles on the pectus near mid coxa; wings with long second vein and with second basal and discal cells confluent; femora slender, unarmed, their tibiae with series of extensor setae.

Synonymy.—The name *Tylos* was applied to this genus by Hendel (1908) in an effort to validate the nomen nudum used by Meigen in a pamphlet entitled "Nouvelle Classification des Mouches a deux ailes . . . Par J. G. Meigen" published by Bauhauer in 1800.[6]

Key to the Neartic Species of the Genus Micropeza

1. Thorax black without pale notopleural strip 8
   Thorax with at least an indistinct pale notopleural strip 2
2. Paracephalon mostly yellow (except *turcana* sometimes), only narrowly black at vertex; mesonotum vittate (pale with three black stripes, or dark with two pale stripes); sternites of female not conspicuously setose 5
   Paracephalon black at least on upper third; mesonotum uniformly black, rarely showing two complete pale stripes 3
3. Paracephalon and occiput pale on lower half or more; antennae of male pale, of female black; palpi pale; femora at most with apical extensor spot; claspers long almost attaining base of abdomen; hind femur of male with long pile on posterior surface ....*ambigua* Cresson
   Paracephalon except occiput and at most narrow oral margin, entirely black; sternopleura black except at pectoral margin; palpi dark; antennae of female black 4
4. Females (male unknown): notopleural stripe indistinct; sternites not conspicuously setose; legs dark, particularly tibiae ......*atra* Cresson
   Both sexes: Pale notopleural stripe distinct; antennae black; palpi dark; femora pale, at most with dark preapical flexor spot; claspers densely setose apically; sternites of female with numerous long black marginal setae ....*setaventris* Cresson

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[6] This pamphlet remained almost unknown until 1908, and the question as to whether it had been published in the legal or valid sense, was submitted to the International Committee of Zoological Nomenclature. (See their Opinion number 28.) We glean from the introduction by Baumhauer and the preface by Meigen, that Baumhauer had considerable difficulty in persuading Meigen to allow him to print this suggestion of a new classification, and had succeeded only by promising that the genera and their diagnosis alone should be printed, in order not to "anticipate" a subsequent work which Meigen was preparing. No species names were cited in these genera and it is to be inferred that Meigen did not consider a genus was valid without the citation of the included species. Hendel acknowledged that he had great difficulty in recognizing many of the genera as diagnosed, and it was only with the aid of Meigen's subsequent work of 1803 that he was able to do so to his satisfaction; a few (including *Tylos*) still remaining doubtful. To the present day there is a division among dipterists as to the validity of these 1800 names. I have always considered that the names were nomina nuda and have refused to recognize them as of Meigen, but rather as of Hendel, 1908, the first author to publish them with included species. (See Collin, in *Ent. Mo. Mag.*, LXIX, pp. 61-65, 1933).

5. **Antennae** pale; mesonotum mostly pale with or without three dark stripes; vertex for most part pale with linear markings 7
   Antennae black 6
6. **Vertex** for most part pale with linear markings, rarely broadly black and then rarely without a pale orbital spot; mesonotum pale, at least postsuturally medianly, with or without three dark antesutural stripes; palpi pale, rarely faintly infuscated; femora rarely infuscated apically; females ....*lineata* Van Duzee
   Vertex broadly black laterally, sometimes paracephalon dark nearly to bucca; mesonotum generally dark with two yellow stripes; palpi dark; legs brownish, femora with apical infuscation; claspers long almost attaining base of abdomen ....*turcana* Townsend
7. **Males**: Claspers short, extending slightly basad of apex of tergite II; posterior surface of hind femur densely pilose .....*lineata* Van Duzee
   Males: Claspers long, almost attaining base of abdomen; posterior surface of hind femur sparsely pilose ....*compar* Cresson
   Females: Femora with more or less distinct disto-median extensor spot; third antennal segment entirely pale (yellow) ....*compar* Cresson
   Females: Femora without such spot; third antennal segment pale apically or entirely ferruginous ....*lineata* Van Duzee
8. **Thorax** for the most part shining to polished; claspers large, foliaceous, much longer than tergite III ....*nitidor* Cresson
   Thorax more or less subopaque and cinereous; claspers small subglobose basally, scarcely longer than tergite III 9
9. **Arista** white; antennae pale; claspers small, subglobose, situated close to genitalia segment ....*abnormis* Cresson
   Arista black; antennae of female black (male unknown) ...*atra* Cresson

Corrigiolata Group

The typical group, containing the genotype, *Micropeza corrigiolata* (Linn.). The species I have included here have the head short, arista white, one notopleural bristle; claspers, when developed situated caudad near genital segments; first posterior cell open.

In possessing but one notopleural, open first posterior cell, white arista, and in general build otherwise, I am considering the following species a member of this group. It has, however, well developed claspers, which are lacking in *corrigiolata*.

The group also contains several Palaearctic and Neotropical species.

Micropeza abnormis Cresson (Pl. XI, fig. I.)

1938. *Micropeza abnormis* Cresson, Ent. News, XLIX, p. 72.

A species similar to the European *M. corrigiolata* (Linn.) but with well developed claspers and differing further in having the antennae pale in both sexes.

Diagnosis.—Black as follows: Head except face, bucca, lateral and posterior oral margins, antennae, thorax except areas around the coxae, abdomen except the male genital segments, claspers, first segment of ovipositor, and tarsi. The pale genital segments of the male with a median dark spot. Basal segment of ovipositor reddish to yellowish. Pale are the coxae, femora except a distomedian and apical flexor spots, and tibiae except their apices. Palpi and wing veins dark. Arista white. Halteres pale.

Thorax and abdomen more or less cinereous but never densely so. Otherwise surfaces more or less shining; the face with usual silvery reflection.

Head relatively stout, almost as high as long (as 27: 30); the paracephalic swelling about one-third length of head. No pectal pile or pile on posterior surface of hind femur. Marginal setae on tergites and sternites not conspicuous but discernable in the females. Claspers (Fig. 1) situated distad close to genital segments, small, scarcely as long as length of tergite V, turgid, their apices rather knob-like, curving mesad hook-like, their cephalic surface sparingly black pilose. Second vein almost straight in entering costa; third costal section one-quarter length of ultimate of vein IV; first posterior cell closed or nearly closed in margin.

Distribution.—This species is known only from the type series of six males and four females from the Baboquivari Mountains, Pima County, Arizona, July 19, (R. H. Beamer), [type ♂, Univ. Kans.].

Turcana Group

The species of this group have given me more trouble than any of the others. Within certain limits the color pattern was so uniformly variable that its specific significance could not be determined until considerable material had been studied. Finally I found that the color of the antennae and the color pattern of the vertex and mesonotum, correlated with the length of the claspers, gave me some semblance of order, and upon these characters I have established the species. Whether or not they will stand as such I leave to those who have the opportunity of studying this group more exhaustively.

In this group are placed those species with elongate head, first posterior cell generally open; tergites III and IV of male not longer than V and VI, thus removing the greatly developed foliaceous claspers far cephalad of the subglobose genital segments (Fig. 2); the bifid apices of the claspers digitate, the filiform fingers bent cephalad; genital styli more or less foliaceous, cruciate, with their bases close together.

Structurally we have two types, of which I can find no intergradation, based on the development of the claspers of the male. These types we may term the *lineata-setaventris* (claspers short), and the *compar-turcana-ambigua* (claspers long), assemblages. However, *lineata* and *setaventris* show more definite structural differences than do the species of the other assemblage. The other species, as far as I am able to determine, are distinguished only by their color pattern, although a study of the genitalia may give us definite morphological differences. The female sex of all these species, with the exception of *setaventris*, on the other hand, show no definite structural differences, and we have to rely wholly on the color pattern. In this however we will have little trouble except with a few individuals of the more plastic species.

On the whole, a difficult group of species that needs a great deal of study with much material from all possible localities within their range. A knowledge of their biology and ethology as well as of their genitalia will probably throw much light on their relationship.

Apparently a group of Nearctic species, although the Palaearctic *lateralis* Loew, known to me only by several females, may belong here and allied to *compar*.

Micropeza lineata Van Duzee (Pl. XI, figs. 7, 8.)

1908. *Micropeza turcana* Cresson (not Townsend). Trans. Am. Ent. Soc., XXXIV, p. 2.
1926. *Micropeza lineata* Van Duzee, Pan. Pac. Ent. III, p. 2.
1936. *Tylos turcanus* Hennig, Konowia, XV, p. 207.

As distinguished from most of the others, we have here a yellowish species with comparatively small black areas or marks, and these are usually in form of stripes. The vertex is mostly yellow and the mesonotum, medianly, either with three stripes or broadly reddish, rarely black. The coloration of antennae and vertex should be sufficient to distinguish this species in most instances.

The species will be most frequently confused with *compar*, particularly in the southern portion of its range, and in such instances we must rely, as regards the males, on the character of the claspers. The latter, in size and general shape show little or no variation, and in all the specimens of this species studied, they are comparatively short, and when folded forwards, against the venter, do not reach the middle of the tergite II, and far from the apex of I; their apical finger is more bent than is normal with the other species. As regards the females of these two species we must rely on the antennal coloration, and to some extent on the more lineate markings of the vertex of the present species. However, a few individuals will show apparent intergradation; the antennae becoming brownish, losing the normal intense black color, or rarely pale. (See note under variations.)

Little or no difficulty will be encountered in separating *lineata* and *turcana*, as that species has the antennae of the males black and the vertex broadly black laterally, and, in all the specimens I have seen of *turcana* the mesonotum is sharply marked with three black stripes. The former character was recognized by Van Duzee, although not by Hennig, in synonymyzing *lineata* under *turcana*; nor by myself in previous determinations of *turcana*.

Van Duzee's specimen, the type, is of the vittate form which I am unable to separate specifically from the apparently more common non-vittate form. There is one character in Van Duzee's description I cannot understand. He describes the hind femur as having " a row of black hairs on middle third of anterior surface ". Could he have meant the long pile on the mesal or posterior surface which is so characteristic of the males of this group? I do not know of any *Micropeza* with such pile on anterior surface.

In my 1908 paper, I misidentified *turcana*, being under the erroneous impression that the antennae of the males of that species are pale. I was followed by Hennig (1936) in this, and in consequence, my determinations of *turcana* prior to the present and his determinations of the males of that species must be referred to *lineata*.

Diagnosis.—Head pale, yellow; with foveal spots and antennae of female, black, the latter sometimes brown and rarely pale; also brown to black are the labyrinthine markings on the vertex, usually along the pattern shown in figure 8, varying as follows: a broad lateral band including outer vertical, extending as a line to foramen and sometimes expanding ventrad along posterior orbits almost to buccal orbit, enclosing a pale, generally conspicuous, yellowish orbital vertex spot; sometimes a dorsal branch includes the inner vertical and postverticals; this pattern encloses an extension of the pale frontal color which dilates on occiput and extends to foramen, enclosing the black ocellar tubercle. This pattern is sometimes reduced to lines or rarely is obliterated; but always the pale orbital spot is present, rarely reduced to a dot, but sometimes extends caudad to foramen, including outer vertical.

Mesonotum with the disk more or less uniformally dark, brown or ferruginous, leaving the broad humeral region, the abruptly narrowed notopleural region, the narrower supra-alar margin and a rectangular median postsutural area, yellow, sometimes with a median postsutural stripe continuing onto the otherwise pale scutellum. Sometimes this dark pattern is reduced to blackish stripes as follows: A median stripe, sometimes divided by a pale line, abbreviated at, or just caudad of the suture; a broader lateral stripe attenuated caudad and abbreviated cephalad. In extreme causes of reduction these stripes may be almost obsolete. The whole dorsal surface of mesonotum is more or less densely cinereous, sometimes almost obscuring the dark pattern.

Pleura mostly pale, with a broad dark, brownish stripe from propleura to base of abdomen; another on pectal portion of sternopleura, removed from mesal margin. Sometimes these stripes are very indistinct and obscured by the cinereous dusting. Sternopleura with several pectal bristles and in the male more or less densely clothed with erect flexous pectal hairs, most of which are pale. Metanotum dark to black. Halteres wholly pale.

Abdominal tergites mostly dark with pale apical and sometimes lateral margins often entirely or distally diluted to body color; lateral margins of tergites with some setae which are stronger in the female. Female sternites narrow with some setae on lateral margins. Legs including coxae, yellow; femora with apices dark, and sometimes with faint preapical flexor spot in the females; tibiae with dark apices; tarsi black. Wings with pale veins.

Mostly subopaque to shining; vestiture sparse: a cinereous postocular area, the usual silvery reflections on face, mesonotum sometimes quite grayish and pleura with some niveous areas.

Head elongate; of male, height to length as 30: 50 (Fig. 7). Eyes elliptoid with axis rather horizontal; postorbits slightly flattened. Frons more or less longitudinally sulcate with orbit sometimes contiguous due to shrinking. Genital segment of male with a round dark sinistral spot. Claspers dependent from about tergite IV, large, foliaceous, about as long as tergites III and IV, and when folded cephalad extends at most slightly basad of apex of tergite II; the apex oblique, with which the bent filiform finger forms an acute angle, lateral margins of apex and finger with black setae, their mesal surfaces with some pale hairs.

Hind femur of male with long erect pale flexuous hair on proximal two-thirds to three-fourths of posterior surface; similar hairs on hind coxae. Vein II of wings parallelling costa, curving at tip, apportioning third costal section to about one-third as long as ultimate of vein IV; first posterior cell distinctly open.

Distribution.—This species has a more extensively known distribution than any other of the genus here treated. Its southern limits seem to be in Utah, Colorado and Kansas, ranging northwards to Washington, Idaho, Montana, Alberta, Manitoba and Saskatchewan. I have not seen it from east of the Mississippi River, nor from New Mexico; and from Arizona and Texas only by the questioned specimens noted below under variations.

The species was originally described on a male from Utah Lake, Lehi, Utah County, Utah, June 25, 1922, (E. P. Van Duzee). [Cal. Acad. Sci., type no. 1879.] I have not seen it but my material from Utah, as well as that from other localities agree well with Van Duzee's description. The sex of the type was not known to the author because of the damaged abdomen, but the presence of pectal pile as described indicates the male sex.

Specimens examined: 294.

CANADA: All [Can.] unless otherwise noted. Alberta.—Lethbridge, VI 18, (H. Pepper), [2♂, 5♀]: Orion, (H. L. Seamans), [2♀]: "Pl. Spgs.", (H. L. Seamans), [2♀]: Medicine Hat, VII 16, (R. S. Carr), [2♀]. Manitoba.—Aweme, VI 6, VII 1, (White, Bird, Criddle), [1♂, 5♀]: Glen Souris, VI 17, (N. Criddle), [1♀]. Saskatchewan.—Roche Percee, VII 4–8, (E. & S. Criddle), [2♂, 1♀].

MONTANA: "Montana", [C. U., 3♀]. Park County.—Gardiner, VIII 17, (A. L. Melander), [Mel., 2♀]. Gallatin Co.—Bozeman, VII 28, (A. L.

Melander), [Mel., 1♀]: Three Forks, VIII 13, (R. H. Beamer), [Kans., 1♂, 2♀].

Nebraska: "Neb", [A.N.S., 1♂].

Kansas: Clark County, VI, (Snow), [Kans., 2]. Cheyenne County, VII 1, (R. H. Beamer), [Kans., 1♀]. Hamilton County, (Snow), [U.S., 2; Kans., 29]. Morton County, (Snow), [Kans., 1].

South Dakota: All (H. C. Severin) and [S.D] unless otherwise noted. "Dac.", [A.N.S., 1]. Union Co.— Elk Point, VI 20, [1♂, 1♀]. Clay Co. —Meckling, VI 13, [8♂, 4♀]. Brookings Co.—Brookings, (J. M. Aldrich), [U.S., 1]: White, VII 26, [1♀]. Charles Mix Co.—Lake Andes, VI 30, [20♂, 13♀]. Jones Co.—Capa, VI 1, [1♂]. Bennett Co.—Martin, VII 6-7, [1♂, 6♀]. Butte Co.—Newell, VII 28, [1♂, 1♀]. Pennington Co.—Rapid City, (J. M. Aldrich), [U.S., 2]. Custer Co.—Custer, VII 16, [2♂, 2♀]. Fall River Co.—Hot Springs, VII 9, [1♀].

Colorado: "Colo.", [A.N.S., 1; Bost., 3; U.S., 1; Col. A., 4]. "Colorado," [U.S., 3♂]. Logan Co.—Sterling, VI, (G. Sandhouse), [U.S., 1]. Bent Co. —Las Animas, VI 17, (Sweetman), [Col. A., 5♂, 5♀]. Arapahoe Co.—Denver, VIII 18, (P. R. Uhler), [M.C.Z., 4♀]. El Paso Co.—Colorado Springs, VII–VIII, (Tucker), [Kans., 2]. Larimer Co.—Fort Collins, VII 28, [Bost., 1]. Boulder Co.—Boulder, VI 25, VII 5, (M. James), [Col. A., 4♀]: 6 miles north of Boulder, VI 22, [Col. A., 1♀]. Moffat Co.—Maybell, VI 30, (L. D. Anderson), [Kans., 5♂, 8♀].

Wyoming: Niobrara Co.—40 miles north of Lusk, [Kans., 5]. Laramie Co.—Horse Creek, VIII, [Kans., 1]. Sheridan Co.—Big Horn, VII 9, [U.S., 1♂]. Fremont Co.—near Lander, 5000 to 8000 ft. alt., VI, (Moodie), [Kans., 9].

Idaho: Nez Perces Co.—Lewiston, (J. M. Aldrich), [U.S., 2]. Jefferson Co.—Market Lake, (J. M. Aldrich), [U.S., 2]. Gooding Co.—Bliss, VII 7, (R. H. Beamer), [Kans., 1♂, 7♀]. Franklin Co.—Franklin, VII 2: Preston, VII 9: Whitney, VII 2: (all Smith & Harmston), [all Utah, 3♀].

Barley, VI 6, (R. H. Beamer), [Kans., 1♀].

Utah: All [Utah] unless otherwise noted. Cache Co.—Logan, VII 19, (G. F. Knowlton), X 22, (D. E. Hardy), [1♂, 1♀]: Wellsville, VII 10, (Smith & Harmston), [1♀]. Weber Co.—Hooper, VII 15, (D. E. Hardy), [2♂, 5♀]: Huntsville, VI 10, (G. F. Knowlton), [1♀]: Plain City, VII 16, (D. E. Hardy), [1♀]. Davis Co.—Farmington, VI 19, (D. E. Hardy), [2♂]. Toole Co.—Opir Mountain, (D. D. Jorgensen), [A.N.S., 1♀]. Salt Lake Co.—Antelope Island, VII 1, (J. Nothingham), [Kans., 11♂, 8♀]. Utah Co.—Spanish Fork, VII 10, (D. E. Hardy), [1♂, 3♀]: American Fork, VII 15, (Knowlton & Smith), [1♀]: Springville, VII 16, (Knowlton & Smith; red clover), [1♂]. Duchesne Co.—Fort Duchesne, VI 28, (G. F. Knowlton), [2♂]. Sevier Co.—Elsinore, VII 27, (G. F. Knowlton), [1♀]: Monroe, VII 22, (G. F. Knowlton), [2♂]. Iron Co.—Little Salt Lake, VII 19: Iron Springs, Cedar City, VI 26: Parowan, VII 24: (all A. L. Melander), [all Mel., 4♀].

Greendale, VIII 11, (Knowlton & Harmston), [Utah, 1♂, 1♀]: Kanesville, VI 16, (D. E. Hardy), [Utah, 1♀].

WASHINGTON: "Wash", [C.U., 1]. Kamiac Butte, (A. L. Melander), [Mel., 1♀].

CALIFORNIA: Inyo Co.—Big Pine, VI 17-19, (E. P. Van Duzee), [Cal., 1♂, 8♀]: Bishop, VI 20, (R. L. Usinger), [Cal., 1♀]: Lone Pine, VI 9-10, (R. L. Usinger), [Cal., 3♀]. Kern Co.—Bakersfield, VI 4, (E. P. Van Duzee, R. L. Usinger), [Cal., 6♀]: Tehachapi Pass, VI 6, (R. L. Usinger), [Cal., 3♀].

Chimney Gulch, VI 12, [A.N.S., 1♂].

Variations.—Two specimens from El Paso, Texas, VII, 11, [M.C.Z.] (one a female, the other possibly the same sex but with apex of abdomen missing) may belong to another species, but they appear to be typical *lineata* particularly as regards the vertex pattern and the non-annulated femora; but they differ from any *lineata* I have seen in having the third antennal segment pale yellow, only the extreme base being infuscated. As they have no disto-median extensor infuscation on the femora, I do not think these can be *compar.* These had been determined as *ruficeps* v. d. Wulp, by C. W. Johnson.

A male, Flagstaff, Arizona, June 7, (Barber and Schwarz), [U.S.N.M.], shows some variation that is worthy of note. The lateral vertical markings are reduced to a fine line between the outer and inner verticals and not complete to the orbits, with a suggestion of a spot between the outer vertical and orbit; thorax without blackish marks, the usual pattern just discernable is reddish; abdomen reddish basally, otherwise pale; fore and mid femora show no apical infuscation; their tibiae pale with their apices dark; (hind legs wanting).

Another male, Huachuca Mts., Arizona, August 1, (R. H. Beamer), [Kans.] is similar but the vertex markings strong, with a comparatively large isolated rounded spot between outer vertical and orbit; femora with subapical extensor spot and hind ones with abundant flexor pile.

Two females, El Paso, El Paso Co., Texas, July 11, 1917, [M.C.Z., Bequaert Colln.]; determined by Johnson as *Micropeza ruficeps* v. d. W. These differ from typical *lineata* in the entire reddish antennae; no dark lines at vertex through the inner and post-verticals; mesonotum more uniformly ferruginous medianly, rather densely dusted with only the two antesutural median lines showing darker; abdomen rather brownish.

Micropeza setaventris Cresson (Pl. XI, figs, 5, 6.)

1936. *Micropeza setaventris* Cresson, Ent. News, XLIX, p. 74.

A darker species than *lineata*, the yellows being more brownish. The claspers are similar, but otherwise differing in its more extensively black vertex, the wholly black mesonotal disk, and the antennae being black in both sexes. Another characteristic of the species is the strong marginal setae on the female sternites, which, although present in *lineata*, are much weaker and less numerous. It apparently holds the same relative relation to *lineata* as *ambigua* does to *turcana*.

Diagnosis.—Similar to *lineata* but darker; the antennae in both sexes, palpi, paracephalon (Fig. 5), occiput, mesonotum medianly, lower part of pleura, are black. The mesonotum sometimes showing two pale spots at base of scutellum which may extend cephalad as two stripes; sometimes the pale sternopleural strip is discernable. The claspers are short as in that species, but the pile and setae at the apices are more numerous and bristle-like; the styli are without lateral tooth. The pectus and posterior surface of hind femur in the male have very little or no pale pile. The femora have a broad subapical infuscation but no disto-median spot; their tibiae are usually darker than in *lineata*, and in some individuals are almost black. The sternites in the female have numerous, strong black setae on lateral margins, which are at least as long as the width of the sternite (Fig. 6). The head is more robust than in *lineata* and the first posterior cell is sometimes closed at the margin.

Distribution.—This species has practically the same range as *lineata*. The type is a male from Fort Duchesne, Utah, [A.N.S.P., no. 6536].

Specimens examined: 58.

SOUTH DAKOTA: All (H. C. Severin) and [S.D.]. Bennett Co.—Martin, VII 7, [1♀]. Butte Co.—Newell, VI 29, [1♂]. Custer Co.—Custer, VII 17, [3♂].

COLORADO: "Colo", (Baker, 1567), [U.S., 1♀]: "Colorado", [U.S., 1♂, 1♀; Kans., 1]. Las Animas Co.—Stonewall, VIII 7, (Rodek & James), [Col. A., 2♀].

UTAH: All [Utah]. Box Elder Co.—Brigham Canyon, VII 15, (Knowlton & Harmston), [1♂ paratype]. Weber Co.—Hooper, VII 15, (D. E. Hardy), [9♂, 11♀ paratypes and 2♂ topotypes]: Huntsville, VII 10, (G.

F. Knowlton), [1♂ paratype]. Cache Co.—Richmond, VII 2, (G. F. Knowlton), [1♀ paratype]: Smithfield, VII 11, (Smith & Harmston), [1♂, 3♀ paratypes]. Duchesne Co.—Fort Duchesne, VI 28, (G. F. Knowlton), [1♂, type, 1♀ paratype].

CALIFORNIA: Mendocino Co.—Yorkville, IV 24, (E. P. Van Duzee), [Cal., 1♂].

NEW MEXICO: "N.M", (J. W. Watson, 3543), [U.S., 1♀]. Torrance County, IX 25, (C. H. Martin), [Kans., 1♂]. Santa Fe Co.—Santa Fe, VII, (T. D. A. Cockerell), [U.S., 1♀]. San Miguel Co.—Pecos, [U.S., 1♂, 2♀].

Variation.—There probably will be found some variation in the dark pattern due to dilution, particularly as regards the tibiae and the distal portion of the abdomen.

Micropeza atra Cresson

1938. *Micropeza atra* Cresson. Ent. News, XLIX, p. 74.

A species distinct from all the others of this group in having the thorax entirely black and somewhat more densely pollinose than is usual. I cannot consider it a dark variety of *setaventris*, which it simulates in many respects, because of the female lacking the characteristic sternal setae of that species; and I do not think it an extreme, dark form of the *turcana* assemblage. It should not be confused with either *abnormis* nor *nitidor*, both of these species belonging to other species-groups.

Diagnosis.—Black, including antennae and arista; the former, however, may be brownish. Yellow to tawny are: the face, oral margin, mouthparts, prosternum, all coxae, halteres, the very narrow apices of tergites. Fore femur black, pale basally; mid and hind femora tawny, darker basally and at extreme apices; tibiae and tarsi black. Wing veins brownish.

Head mostly shining to polished, with the usual cinereous postocellar areas and the silvery facial reflections. Mesonotum rather densely cinereous, but not opaque, becoming shining towards humeri; pleura somewhat niveous. Scutellum and notopleura similar to mesonotum. Abdomen sparsely brown pollinose. Ovipositor polished.

Head about one and one-half times as long as high. Sternites narrow, inconspicuously setose laterally; ovipositor segment about as long as the abdomen. Third costal section about one-half as long as the ultimate of vein IV; first posterior cell open.

Distribution.—This species is known only from the type, a female from Flagstaff, Coconino County, Arizona, June 7, (H. S. Barber), [U.S.N.M., no. 27059]; and another female from Jemez

Mountains, Sandoval County, New Mexico, May 29, [U.S.N.M.]. The latter, however, is smaller than the type and the femora are entirely black although the coxae are pale. It is not in perfect condition.

Although the male of this species is unknown, I suspect, from the general habitus of these females, that we have a species of the *Turcana*-group, and further I suspect that the male will prove to have the genitalic assemblage of that group, and that the claspers will be short, of the *lineata* type.

Micropeza compar Cresson

1938. *Micropeza compar* Cresson, Ent. News, XLIV, p. 73.

A species differing from *turcana* in its general paler color, particularly of the paracephalon, in which respect it stimulates *lineata*; the antennae in both sexes are typically pale, although in the females they are sometimes dark but not intensely black. From *lineata*, the males are readily separated by the longer claspers; the females on the other hand, are more difficult as the typically pale antennae are inclined to become brownish, a variation also met with in *lineata*. In these cases we have to reply on the more intense vertex markings and the more definite femoral annulation of the present species.

Diagnosis.—♂. Pale species, including antennae and palpi; black to ferruginous are: arista, ocellar spot, broad lateral margins of vertex attenuated to foramen, median line on mesofrons, small foveal spot, four antesutural lines the lateral one abbreviated cephalad but extending postsuturally, a paler median postsutural line extending onto the scutellum, broad pleural band, and metanotum. The mesonotum may be ferruginous medianly, but usually the two to four antesutural black stripes are present. Tergites more or less brownish except at margins, and the usual black sinistral spot on genital segments distinct. Femora with more or less distinct disto-median extensor spot and their apices, dark; apices of tibiae and all tarsi, black.

Head robust, about one and one-half times longer than high. Pectal and hind femoral pile very sparse, the hairs being straight rather than flexous and those of the femur confined to the basal third. Claspers large, broad, easily attaining base of abdomen, with the apical fingers slightly curved.

♀. Similar to the male but darker. The antennae showing some infuscation but never intensely black and the third segment always pale at inferior margin. The dark markings in general, somewhat more extensive and the tergites showing very narrow pale margins. Ovipositor segment dark basally. The dark disto-median femoral spot inclines to form a complete ring.

Distribution.—This species is known only from Arizona and New Mexico, and was originally described from the former state; the type is a male in the Snow collection of Kansas University.

Specimens examined: 20.

ARIZONA: Gila Co.—Pinal Mts., VI 11, (Parker), [Mel., 2♂, 2♀]. Cochise Co.—Chiricahua Mts., VII 8, (R. H. Beamer), [Kans., 1♂, 3♀ paratypes; 2♀]: 8500 to 9700 ft. alt., VIII 5, (J. A. Kusche), [Cal., 2♂, 1♀]: Huachuca Mts., VII 8, (R. H. Beamer), [Kans., ♂ type, 2♀ paratypes, 1♂]. Santa Cruz Co.—Santa Rita Mts., VII 17, (R. H. Beamer), [Kans., 1♀ paratype]. Pima Co.—Mt. Lemon, 7800 ft. alt., Santa Catalina Mts., VII 29, [M.C.Z., 1♂].

NEW MEXICO: Valencia Co.—Belen, VIII 19, (R. H. Beamer), [Kans., 1♀].

Micropeza turcana Townsend (Pl. XI, figs. 2, 3, 4.)

1892. *Micropeza turcana* Townsend, Trans. Kans. Acad. Sci., XIII, p. 136.
1935. *Micropeza jamesi* Cresson, Ent. News, XLVI, p. 229.

This species is distinguished by the broad, black, lateral vertex stripes, antennae in both sexes black, vittate mesonotum and the long claspers.

As noted under *lineata*, this species has been misidentified by all students except, probably, M. C. Van Duzee in his 1926 paper on the genus; and all published records of *turcana* apply to *lineata*. My erroneous identification in 1908[7] was due to a misidentification of the sex of the only specimen I had agreeing, as I thought, with Townsend's description of *turcana*. The synonymy of *jamesi* is established by comparison with the type and female paratype of that species.

Diagnosis.—♂. General color, pale yellow to reddish yellow. Black to blackish as follows: Broad lateral vertex stripes from orbits to foramen (the pale yellow of the frons, typically continues onto the occiput, isolating

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[7] See reference under *lineata*.

the black ocellar tubercle), antennae, arista, foveal spot, palpi, three broad mesonotal stripes of the usual pattern (the median one usually distinctly continuing narrowly postsuturally over onto the scutellum which latter is also black laterally, leaving two narrow pale median mesonotal stripes), pleural stripe from prosternum to base of abdomen including metanotum, a broad pectal stripe, abdominal tergites except sometimes their apical and lateral margins, (but distal tergites in the males usually becoming pale), a round sinistral spot on genital segment (tergite VIII). Femora generally with faint preapical flexor spot; tibiae sometimes wholly brown, but their apices and all tarsi, black. Wing veins pale.

The dark mesonotal disk, scutellum and pleura distinctly pollinose, sometimes densely so, to almost obscuring the two pale stripes, the tergites less so; otherwise surfaces shining to polished; face with usual silvery reflection. Head elongate, nearly twice as long as high. Eyes with axis rather horizontal. Tergite VI about twice as long as III. Claspers long, about as long as tergites IV and V, and when folded cephalad against venter, almost attaining base of abdomen; the fingers but slightly bent, with numerous black setae. The pale pile of the pectus and hind femur is much less abundant than in *lineata,* and the hairs less flexuous. Second vein long, apportioning third costal section to about one half of ultimate of vein IV; first posterior cell broadly open.

♀. Similar but the darker areas and marks more extensive; the stripes of mesonotum sometimes almost coalesing, and the lateral vertex stripes extending along posterior orbits almost to line of buccal orbital. Margins of tergites less inclined to paleness. Sternites with some marginal setae; base of ovipositor pale.

Distribution.—This species was originally described from six males and two females, collected at Turkey Tanks, Coconino County, Arizona, by C. H. T. Townsend, July 1, 1892. The type has never been designated. Through the kindness of Dr. R. H. Beamer of Kansas University, I had the privilege of examining one of the two males in the collection of that university. This one I have designated the lectotype of the species. I do not know of the present distribution of the other paratypes except four males, one without abdomen, I have seen in the Museum of Comparative Zoology.

From our present knowledge of this species, it is very local, but from rather widely separated localities. The type series was collected in a large open stretch of meadow-like country about five or six miles east of the base of the San Francisco Mountains, Arizona.

Specimens examined: 27.

COLORADO: Weld Co.—Roggen, V 19, (M. T. James & T. D. A. Cockerell), [A.N.S. and Col. A., 5♂, 3♀, type and paratypes of *jamesi*].

ARIZONA: Coconino County, VII 1, (Anderson & Oman), [Kans., 6♂, 7♀]: Turkey Tanks, VII 1, (C. H. T. Townsend), [Kans., ♂ type, 1♂ paratype; M. C. Z., 4♂ paratypes].

Micropeza ambigua Cresson

1908. *Micropeza* (*turcana*) *ambigua* Cresson, Trans. Am. Ent. Soc., xxxiv, p. 3, pl. 1, figs. 1 and 2.
1936. *T*[*ylos*] *t*[*urcanus*] var. *ambiguus* Hennig, Konowia, xv, p. 207.

I cannot, of present knowledge, treat this as a variety of either *turcana* or *lineata*. The mesonotal marking and antennal coloration are too constant in the series examined. However, some individuals of *lineata* have the *ambigua* pattern of the mesonotum indistinctly developed, but in such cases, particularly females, the color is rather reddish and the pattern rather suggestive than actual. The male claspers certainly separate this species from *lineata*.

To *turcana*, the present form is similar in general structure and color, differing in its uniformally black mesonotal disk, with no vittation apparent except in specimens with recessive color pattern. The antennae are pale in the male, black in the female, and the palpi are pale. The abdomen is usually entirely black with only the margins of the tergites pale, and very seldom becoming pale distally. The claspers are as in *turcana* but apparently not so long. The femora show no distomedian spot and faint if any apical infuscation, but the latter is very distinct on the pale tibiae. The pale pile of the pectus and posterior surface of hind femur in the male is about as in *turcana*. The head is generally less elongate.

Distribution.—This species was originally described from Cloudcroft, New Mexico. The type (lectotype) is a male, collected May 27, 1902; present selection, [A.N.S.P., no. 6011].

Specimens examined: 38.

CALIFORNIA: All [Cal.]. Inyo Co.—Bishop, VI 20, (R. L. Usinger), [1♀]. Mendocino Co.—Yorkville, IV 24, (E. P. Van Duzee), [1♀].

ARIZONA: Coconino Co.—Flagstaff VII 23, (Wildermuth), [U.S., 1].

NEW MEXICO: Sandoval Co.—Jemez Mts., VI 16, (J. Woodgate), [C. U., 1♀]; VII 5, (J. Woodgate), [A.N.S., 1♂]: Jemez Springs, V, [Adams, 2♂, 2♀]. Otero Co.—Cloudcroft, V 23–VI 18, (H. L. Viereck), [A.N.S., 7♂, 8♀, type and paratypes]; VI 28, (R. H. Beamer), [Kans., 3♂, 10♀]: High Rolls, V 31, (H. L. Viereck), [A.N.S., 1♀].

Hartford, VII 17, (M. B. Jackson), [Kans., 1♀].

Nitidor Group

We must recognize this group if the genitalic assemblage is to be considered. Here we have large, foliaceous claspers which are rather heavily chitinized, with revolute caudal margins; the cleft apices are not digitate but rather mucronate, mesally hamate or pociliform; the styli are more calcariform, widely separated at their bases.

But one species is known to me, which in other respects is more robust than those of the *turcana* assemblage; the head being shorter and the first posterior cell is closed and sometimes petiolate.

Micropeza nitidor Cresson new name (Pl. XI, figs. 9, 10.)

1936. *Tylos nitidus* Hennig, Konowia, xv, p. 212. (Not *Micropeza nitidus* Robineau-Disvoidy, 1830.)

A species characterised by its glossy black thorax, the parts in proximity to the legs only being yellow. The greater portion of the head and abdomen are also black. Hennig's description, based on a female, is not very full, but I have no doubt that the material before me and upon which the following description is based, also from about the same locality in Arizona, is his species.

As Hennig's name cannot be used in *Micropeza* because of Robineau-Desvoidy's prior use, a new name is necessary.

Diagnosis.—♂. Black; ferruginous to yellow are: two median orbital spots on the frons sometimes fused together, or, entire anterior part of frons, antennae, face except the foveal spots, oral spot on paracephalon, mouth parts, ventral portion of thorax around all coxae, more or less of apical and lateral margins of tergites and venter. Pale yellow are: the halteres, all coxae, fore femur except distal third, mid and hind femora, basal half of mid and hind tibiae, the large claspers, and pulvelli. Wings yellowish.

Most surfaces are polished to shining. Some sparse grayish dusting on postsutural mesonotum, scutellum, posterior parts of pleura, metanotum and abdominal dorsum.

Head distinctly longer than high (about as 35 to 25), with paracephalon nearly one-third as long as head, the frons but slightly projecting cephalad. Eyes round. The claspers with very much enlarged foliaceous base; the caudal margins much thickened and revolute; their attenuated apices curving mesad and developed into cup-like processes by the modified revolute caudal margin. The styli are widely separated at their bases, with tooth-like heavily chitinized apices which curve mesad over each other. Sternites I to IV are membraneous. One pectal sternopleural bristle, no pectal pile, nor mesal pile on hind femur. Third costa section about one-fourth as long as ultimate of vein IV; first posterior cell closed at margin.

♀. Similar but the frons generally darker with the two orbital spots more conspicuous and sometimes fused together, and the face may also be black. Sternites without marginal seta. The ovipositor segment is about as long as tergites III to V inclusive.

Distribution. — This species was originally described and is known only from the Santa Catalina Mts., Arizona. The type is a female from Bear Wallow, 8000 ft. alt., in the collections of the American Museum of Natural History.

Specimens examined: 3.

ARIZONA: Pima Co.—Mt. Lemon, Santa Catalina Mts., 7800 ft. alt., VII 29, (J. Bequaert), [A.N.S., 1♂, 1♀]: Mud Springs, Santa Catalina Mts., 32° 23′ 3″ N., 110° 45′ W., 6500 ft. alt., VII, [A.M.N.H., 1♀].

NERIOCEPHALUS Enderlein

1922. *Neriocephalus* Enderlein, Arch. f. Naturg., LXXXVIII, A, p. 160.
1922. *Metopobrachia* Enderlein, Arch. f. Naturg., LXXXVIII, A, p. 161.
1922. *Cliopeza* Enderlein, Arch. f. Naturg., LXXXVIII, A, p. 162.
1932. *Neotylus* Hendel, Konowia, XI, p. 121.

Those species having two notopleural bristles, I am grouping under this generic name. As in *Micropeza*, we find here about the same range of variation in the shape of the head, in the closing of the first posterior cell and in the genitalic assemblage. However, as regards the latter, the most typical form seems to be that in which the claspers are simple, the more or less cylindrical base bearing two straight conical prongs; but we also find these organs undeveloped, or with a foliaceous base; and in one species, with bent apical fingers, as we find in the *turcana* group of the genus *Micropeza*.

Neriocephalus was erected for three species, with *Micropeza appendiculata* Schiner, 1868, as the designated genotype. My specimen of that species is a male, with a robust but not foreshortened head and the first posterior cell closed. The claspers have the apices produced straight, somewhat finger-like, not bent. The thorax is rather uniformly opaque, mesonotum brownish with dark lines and spots, the pattern very similar to that of *stigmatica* (Fig. 11).

Synonymy.—Metopobrachia was erected for five species with *Micropeza obscura* Bigot, 1886, as the designated genotype. My series of that species has two notopleurals but not possessing the male sex, I cannot determine the type of the claspers. The head is very short and high, and the first posterior cell is slightly open.

Cliopeza originally contained three species with *Micropeza pectoralis* Wiedemann, 1830, as the designated genotype. My series of *occipitalis* van der Wulp, 1897, which Enderlein considered synonymous with *pectoralis*, has two notopleurals, a robust but not particularly short head, first posterior cell closed and the claspers large, digitate apically, and bent as in *Micropeza turcana*. This is the only species known to me falling in the present genus having such type of claspers.

The synonymy of *Neotylus* is discussed under *stigmatica*.

Key to the Nearctic Species of Neriocephalus

1. Thorax somewhat shining, rather ferruginous with pale notopleural stripe; head very slender 3

   Thorax opaque, cinereous to brownish gray and generally marked with brown stripes and spots; no pale notopleural stripe 2

2. Thorax marked with brown stripes and spots; mostly pale to ferruginous species with rather stout, robust head and white arista. *stigmaticus* (van der Wulp)

   Thorax densely cinereous, at most with two blackish median mesonotal stripes; cinereous vertex with two shining black lines; mostly black species except legs; head slender; arista black ..*bisetosus* (Coquillett)

3. Thorax marked with dark stripes on mesonotum and pleura; legs with dark disto-median bands ....*texanus* (Cresson)

   Thorax without distinct darker stripes; legs with only apical bands on femora ....*productus* (Walker)

The species known to me belonging to this genus seem to fall into several groups, but I will not attempt to define them here. However, I consider that *bisetosa*, *producta* and *texana*, *stigmatica*, and *ruficeps* represent four of them.

Neriocephalus bisetosus (Coquillett)

1902. *Micropeza bisetosa* Coquillett, Jour. N. Y. Ent. Soc., x, p. 177.
1936. *Tylos bisetosus* Hennig, Konowia, xv, p. 207.

A dark, densely pollinose species, easily recognized by the two shining lines on the vertex between the inner and outer verticals. The head is elongate with pale antennae; genital segments similar to those of *stigmatica*, with the styli concealed, but no developed claspers; first posterior cell is closed at or slightly before the margin.

Hennig (1936) does not include this in his key to the species of the genus, although he cites it for original record.

Diagnosis.—♂. Black to brown; pale yellow to ferruginous are: frons anteriorly, and medianly to ocelli, face, lower part of paracephalon, lower occiput, antennae, propleural scales, propleura, more or less of pectus, halteres, distal tergites, more or less of genital segments, venter, coxae, femora except apices, and wing veins. Arista black.

All black dorsal areas densely cinereous; vertex with lateral shining lines between the inner and outer verticals; four faint brownish lines is the usual pattern of the mesonotal vittation; pleura also densely cinereous.

Head slender to stout, length to height about as 1.5: 1; inner verticals far caudad of line of postorbits. Tergite VI very short, about one-half as long as III; claspers undeveloped, represented by the apically dilated sternite V overlapping VI, its apex very broad and slightly concaved; styli short, scale-like convex, subrotund in outline, conspicuous when exerted, their apices broadly rounded with numerous short black spinules on their inner surfaces. Second vein long; third costal section is to ultimate of vein IV as 1: 2.7.

♀. Similar; antennae paler.

Distribution.—This species has been recorded only from Arizona and New Mexico. It was originally described from a specimen of each sex; the type is a male from Prescott, Arizona, June 20, (H. S. Barber) [U.S.N.M., no. 6626]. The female, paratype, is from Las Vegas, Hot Springs, New Mexico, Aug. 9, (H. S. Barber), [U. S.]. Hennig's record (1936, p. 208) of *ventralis* Cresson from Arizona should probably be referred to this species.

Specimens examined: 18.

ARIZONA: All (R. H. Beamer) and [Kans.] unless otherwise noted. Yavapai Co.—Prescott, VII 24, (O. C. Poling), [A.N.S., 1♀]. Cochise Co.—Huachuca Mts., VII 8, [1♂]. Santa Cruz Co.—Santa Rita Mts., IV 7-17, [3♂, 10♀]. Santa Cruz County, VIII 4, [1♀].

NEW MEXICO: All [Kans.]. Grant Co.—Silver City, VII 22, (D. R. Lindsey), [1♂]. Otero Co.—Cloudcroft, VI 28, (R. H. Beamer), [1♀].

Neriocephalus productus (Walker)

1849. *Micropeza producta* Walker, List Dipt. Brit. Mus., IV, p. 1056.
1936. *Tylos productus* Hennig, Konowia, xv, p. 209. (Citation only.)

This species as here characterized is quite similar in general build to *texanus*, but is very different in coloration.

I have seen but one specimen of what appears to be this species. The original description is of the male sex from Georgia, from which we may glean the following essential characteristics:

> "Body bright ferruginous . . . head lengthened in front . . . ; palpi yellow . . . ; feelers black . . . , bristle black . . . ; abdomen . . . pitchy towards the tip, tawny beneath and at tip; legs tawny . . . , feet and tip of the thighs and the shanks pitchy . . . ; fourth and fifth longitudinal veins united near the tip of the wings. Length 2½ lines" [5.3. mm.].

The specimen before me, also a male, agrees well with the above, and is the basis of the following diagnosis.

Diagnosis.—General color yellow to tawny; black as follows: antennae, arista, apices of femora, distal portion of tibiae, all tarsi and the narrow lateral lines on the vertex.

Head very elongate,[8] nearly twice as long (excluding antennae) as high (as 45: 25); several distinct setulae on lateral occiput near foramen. Abdominal tergite VI slightly shorter than III; claspers comparatively short, not as long as tergites III and IV together, their somewhat filiform apical fingers not longer than the width of base, are slightly curved mesad and with opposing cup-like tips, with a few setae and hairs; the large styli are cruciate, deeply cleft with two broad asymetrical teeth or prongs. Second vein curving into the costa, apportioning the third costal section about one-third of ultimate of IV; first posterior cell in one wing closed at margin, in the other distinctly petiolate.

Length: 5.5 mm.

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[8] The head of this specimen appears to be more shrunken than is usual, causing the frontal orbits to overlap each other, on the whole giving the head an unusually elongate appearance.

Distribution.—The species is known to me only from Georgia. Loew records it from Cuba[9] and Johnson[10] from Jamaica. Hennig (1936) suggests that Loew's reference is probably *verticalis* Cresson.[11]

During a recent visit to Cambridge, I was able to examine the specimens from Jamaica determined by Johnson. They are not *productus* but a species similar in appearance.

The specimen before me is a male from Cannoche River, Groveland, Bryan County, Georgia, July 28, 1913, (J. C. Bradley), [Cornell Univ.].

Neriocephalus texanus (Cresson)

1938. *Micropeza texana* Cresson, Ent. News, XLIX, p. 75.

Very similar to *productus* (Walker), but distinct in its trivittate mesonotum.

Diagnosis.—Yellow to ferruginous including palpi; black to brown are: vertex and upper half of paracephalon and occiput except narrowly around the ocelli, a narrow line including outer verticals, frons, foveae, antennae (arista pale but not niveous), a median antesutural and two postsutural stripes on mesonotum (the median one continuous narrowly caudad, the others continued broadly cephalad of the suture and attenuated caudad), scutellum except pale apex, pleural line including propleural scale and continuous with the black metanotum, a pectal line, abdominal tergites except their narrow margins, two spots on male genital segment, disto-median and apical rings on femora, broad apices of tibiae and all tarsi. Halteres dark in part.

More or less shining species but mesonotum and particularly the pleura are distinctly cinereous, almost obscuring the ground color pattern; abdomen as usual somewhat grayish and subopaque. Venation rather dark.

Head slender and elongate, about twice as long as high (as 30: 15). Tergites II and IV slightly longer than V and VI. Claspers of male similar to those of *productus* but the fingers more slender: styli also similar to those of *productus* but the longer lateral prong is more slender and thornlike. Second vein rather abruptly curving into the costa, apportioning the third costal section to about one third of ultimate of vein IV. First posterior cell closed and petiolate.

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[9] Berl. Ent. Zeit., XII, p. 167, (1868).

[10] Proc. Acad. Nat. Sci. Phila., 1894, p. 280, (1894).

[11] Trans. Amer. Ent. Soc., LVI, p. 357, (1930).

Distribution.—This species is known only from Texas. The type is a male from Corpus Christi, [U.S.N.M., no. 27061]. The following material is before me:

Specimens examined: 4.

Texas: All [U.S.]. Tarrant Co.—Handley, IV 22, (W. D. Pierce; Hunt no. 98), [1 ♀]. Victoria Co.—Victoria, V 8, (Mitchell; sweeping herbage), [1 ♂]. Nueces Co.—Corpus Cristi, IV 13, (F. C. Pratt), [♂ type, 1 ♂ paratype].

Neriocephalus stigmaticus (van der Wulp) (Pl. XI, figs. 11, 12.)

1897. *Micropeza stimatica* van der Wulp. Biol. Cent.-Amer., Dipt., ii, p. 366, pl. 9, fig. 17.
1922. *Neriocephalus stigmaticus* Enderlein, Arch. f. Naturg., A, lxxxviii, p. 160.
1930. *Micropeza stigmatica* Cresson, Trans. Am. Ent. Soc., lvi, p. 358.
1932. *Tylus* (*Neotylus*) *longiceps* Hendel, Konowia, xi, p. 123 [Syn. by Hennig 1936.]
1932. *Tylus stigmaticus* Hendel, Konowia, xi, p. 124.
1936. *Tylos stigmaticus* Hennig, Konowia, xv, p. 358. [Distribution and syn. of *longiceps* Hend.]

This species is recognized by the general reddish color, without any blackish markings except on the halteres and legs. The reddish ground pattern will sometimes be brownish in the more intensely colored individuals. The cinereous thorax shows, besides the mesonotal markings, numerous irregular dark reflecting spots on the pleura. The brown mesonotal markings vary to some extent as is here described.

I am using van der Wulp's name as my series is in perfect agreement with his description. Hendel (1932) erected the subgenus *Neotylus* (genotype *Micropeza brasiliensis* Schiner, 1868), for those species having a series of extensor setae on the mid and hind femora. He did not consider *stigmaticus* a member of that group, but my series shows this character in all stages of intergradation, sometimes completely absent. I do not see any grounds for the subgenus.

Diagnosis.—General ground color ferruginous; paler, light yellow to tawny are: frons to ocelli except sometimes two dark spots at anterior margin, vertex stripes including the outer vertical, lower part of paracephalon, mouth parts, antennae, thorax ventrally, genital segments, venter and claspers, coxae, femora except the disto-median and subapical rings on latter, tibiae except apices. Dark, brown to black are: a median spot on paracephalon contiguous with orbit, halteres knob, sometimes the tergites, disto-median and subapical femoral rings, apices of tibiae, all tarsi, apical spot on the terminal genital segment (ninth), and apical section of ovipositor. Sometimes the paracephalon is brown, except for the oral margin and the stripe at outer vertical. Basal section of ovipositor, ferruginous. Wings yellowish with pale veins.

Shining to polished are: foveae, most of paracephalon, propleural scales, genital segments, coxae and femora. Frons opaque yellow; face with usual silvery reflection. Opaque cinereous to ochraceous are: two broad stripes at vertex including inner and post-verticals, mesonotum and scutellum. On the pleura and metanotum the pollen is more whitish to niveous, which on the pleura is variegated with dark irregular reflecting spots. The mesonotum is marked with brownish lines and spots as figured (Fig. 11), which pattern is subject to some variation in the following respects: The median line may be obliterated, at least postsuturally; the other two may be much abbreviated anteriorly and the broader antesutural stripe laterad of these lines may be absent or represented only by an anterior triangular spot. In individuals from the more southern localities, the general mesonotal pattern may become more intensive, giving a design of cinereous lines on a darker ground, and the flat postsutural area may be almost uniformly dark. The scutellum is generally dark on the disk. Abdominal tergite II generally with a whitish band, and the others with the pale incisures also whitish.

Head elongate, almost twice as long as high; eyes round; one pectal seta present. Tergites III and IV longer than V and VI, placing the claspers towards apex of abdomen. Genital segments not dorso-ventrally elongate, but arranged more in line with the main axis of the abdomen (Fig. 12); the styli retracted but visible, when not exerted, just beyond the emarginated margin of the broad sixth sternite. Claspers with foliaceous base not much longer than tergite V; the bifid apex with short subfiliform to subconical fingers. Mid and hind femora sometimes with series of several distinct extensor setae. Basal section of ovipositor somewhat constricted towards apex. Second vein of wings long, paralleling, and abruptly curving into the costa, apportioning the third costal section to about one-half of ultimate of vein IV. First posterior cell closed at or some distance before margin.

Distribution.—This seems to be, primarily, a Neotropical species. It was originally described from several specimens of both sexes from several localities in Mexico. The type should be selected from the cotypic series which should be in the British Museum of Natural History. I have recorded it (1930) as ranging southwards to Argentina, and the series now before me extends it northward to Arizona and New Mexico. Whether or not the more southern records should be applied to this species, at least to its typical form, I will not discuss as such extra limital forms are not directly concerned in the present paper. Its distribution north of the Mexican boundary as known to me may be recorded as follows:

Specimens examined: 52.

KANSAS: Douglas county, VIII, (Snow), [Kans., 13].

ARIZONA: Cochise Co.—San Bernardino ranch, VIII, (Snow), [Kans., 1]. Pima Co.—Tucson, (Snow), [Kans., 1]; IX 1-6, (F. M. Carpenter), [M.C.Z., 3♂, 4♀].

TEXAS: Comal Co.—New Braunfels, VII 20, (Nabours & Sabrosky), [Sab., 1♂, 1♀]. Hidalgo Co.—Hidalgo, VII 28-30, (R. H. Beamer), [Kans., 3♂, 8♀]. Cameron Co.—VIII 8, (R. H. Beamer), [Kans., 1♂, 1♀]: Brownsville, VI 25, (J. O. Martin), [Cal., 4♂, 4♀]; VI, [Kans., 2]; XI 24, (Sweeping grass), [Ill., 5].

Neriocephalus ruficeps (van der Wulp) (Pl. XI, figs. 13, 14.)

1897. *Micropeza ruficeps* van der Wulp, Biol. Cent.-Amer., Dipt., II, p, 365.

1923. *Micropeza flaviventris* Cole, Proc. Cal. Acad. Sci., XII, p. 477.

This is a ferruginous species with reddish occipital stripes, a general reddish, cinereous, thorax, and closed first posterior cell. Cole's *flaviventris* appears to be merely a darker form with the thorax more densely pollinose, particularly the mesonotum on which there are distinct brownish stripes, two narrow median antesutural, and a broader lateral one interrupted at suture; the postsutural median region is more or less brown. The male I have from Palm Springs, California agrees well with Cole's description based on three females from Lower [Baja] California, one of which I have seen, through the kindness of Mr. E. P. Van Duzee of the California Academy of Sciences. This darker form suggests *stigmaticus*, from which it is easily separated by the different pattern of the mesonotal markings and the absence of any disto-median femoral ring. The claspers are very different.

Diagnosis.—♂. Yellow to tawny; brown to reddish are: vertex vittae from orbits to inner vertical bristles (leaving the pale frontal stripes continuous with the pale occiput entirely enclosing the black ocellar tubercle), a broad postorbital stripe just ventrad of the outer vertical, another narrower stripe at buccal orbit, median frontal stripe, mesonotum medianly becoming more broadly so postsuturally, scutellum except sometimes apex, pleura except mesal pectal margin of sternopleura, some spots on claspers, apices of femora and tibiae. Darker to black are: spot on knob of halteres, abdominal tergites except narrow apical and lateral margins, two spots on genital segment, and all tarsi. Sometimes the thorax is blackish, densely gray pollinose, the mesonotum with two narrow median, and a broader, sublateral brown stripe. Wing veins pale.

Head about one and one-half times longer than high with paracephalon about one-third length of head; eyes somewhat in vertical axis; occiput with a cluster of setulae near foramen and at post-oral margin. Sternopleura with two pectal bristles and some black setae but no pale pile. Hind femur without mesal pile. Tergites V and VI short, each shorter than IV. Claspers (Fig. 13) about as long as tergites III to V inclusive, with large bulbous basal portion and with a cephalic cleft almost to base, the caudal margins thickened and more or less revolute mesad; distally produced into two broad foliaceous claspers almost as long as the basal portion and which curve mesally and provided with some setae along their cephalic margins and at apices. Styli (Fig. 14) broadly separated at their bases, somewhat filiform, attenuated into spine-like apices which are slightly divergent at their tips. Third costal section about one-third as long as ultimate of vein IV; first posterior cell closed at or slightly before margin.

♀. Similar with a dark ovipositor about as long as the abdomen, the first segment very broad medianly.

Distribution.—This species was described from a female from Northern Sonora, Mexico, (Morrison), [British Mus. Nat. Hist.]. It has not since been recorded until the present. The material before me and upon which the above description is based, I feel sure is of this species.

Specimens examined: 7.

California: Riverside Co.—Palm Springs, VII 13, [Bost., 1♂].

Arizona: Pima County, VII 27, 28, (Beamer & Readio), [Kans., 1♂, 2♀]: Sabino Canyon, Santa Catalina Mts., VII 13, (R. H. Beamer), [Kans., 2♂, 1♀].

Neriocephalus californicus (Van Duzee)

1926. *Micropeza californica* Van Duzee, Pan-Pacific Ent., III, p. 1.

I do not know this species, but being described as having the arista white, the femora annulated, the first posterior cell closed, and the probability that there are two notopleurals (judging from the description of the thoracic bristles), I am placing the species here, making no suggestion as to its probable status otherwise. Because its author states that the femoral ring is proximomedian (" at basal two-fifths "), it is rather unique. The following diagnosis is abstracted from the original description.

Diagnosis.—Antennae reddish with white arista. Paracephalon shining yellow with a broad U-shaped black mark at vertex including the black ocellar spot, inner and post-verticals, but not the outer-verticals. (The description of the thoracic chatotexy is not clear, in that the author states there are " two bristles back of the suture, and one near the pleural suture half way from the humeri to the suture [possibly the anterior of two notopleurals], two or three bristles below and back of the root of the wing "); mesonotum black medianly, yellow laterally, not vittate; pleura wholly reddish, abdomen black; femora reddish yellow with dark proximomedian and subapical spots or rings. First posterior cell closed and short petiolate.

Length: 8 mm.

Described from one female, Palm Springs, Riverside County, California, April 3, 1925, (E. C. Van Dyke), [Type, Calif. Acad. Sci.].

Subfamily CALOBATINAE

1922. Calobatinae Enderlein (in part), Arch. f. Naturg., LXXXVIII, A, p. 141.
1927. Calobatinae Frey, Not. Ent., VII, p. 66.
1934. Trepidariinae Hennig, Stet. Ent. Zeit., XCV, p. 68.
1930. Trepidariinae Czerny, Lind. Fl. Pal. Reg., Fam. 42, p. 2.

In this subfamily we do not have such morphological variations, particularly of the head, as we find in the Micropezinae. All the species have a short, more spherical head (except in *Calobatella*) and, while the thorax and abdomen are elongate, the former is never excessively so. They do, however, excel in the diversity of forms of the claspers, and besides these, the members of the subfamily are distinguished by having a distinct basal crossvein, uniformally opaque, not partly shining, frons, lacking well defined area; and other characteristics here given.

As essential characters of the subfamily, Czerny (1930) used the absence of the extensor tibial setae, Hennig (1934), the absence of distinct frontal areas and the presence of the second basal crossvein.[12] In this subfamily Enderlein (1922) included the genus *Taeniaptera* (as *Tanipoda*) and its allies, now constituting the Taeniapterinae. He distinguished his Calobatinae by the dorsal position of the arista and the separation of the second basal and discal cells. Although he used the generic name *Calobata*, he did not refer further to that nor to any other true species of the genus, but considered a number of Oriental Taeniapterinae which have no affinity with *cibaria*. It is difficult to understand his conception of the genus *Calobata*.

Subfamily characteristics.—Head subglobose, not elongate in profile, except in *Calobatella*, nor with extensive paracephalic extension. Frontal areas not marked, the frons being uniformly opaque with silvery orbits; chaetotaxy normal but frontals sometimes absent. Face moderately broad and for the most part strongly retreating; facials very weak, hair-like. Antennae short. Thorax moderately elongate, the prescutum usually with distinct anterior hump; humeri usually short; sternopleura with several setae at caudal margin; chatotaxy normal; two notopleurals. Males with globose postabdomen (segments VII-IX) and most species with greatly developed claspers (Figs. 15, 16, 18, 19, 21, 22), which in most of our species are much enlarged, so much so as to noticeably deform the third and fourth tergites and apparently forcing basad their corresponding sternites; subject to considerable variation in their shape, but in most cases the base or united portion, when present, is short, the fingers comparatively long, and variously shaped. The female ovipositor segment is short and broad, not awl-shaped. Legs without bristles or noticeable setae except on tarsi. Wings long with long second vein; first posterior cell widely open; second basal and discal cells separated by a distinct second basal crossvein; anal crossvein short, straight and perpendicular to vein V.

Genera of the subfamily.—The species of this subfamily, with the exception of the genitalia, particularly of the male sex, have very few and comparatively insignificant differential structural characteristics, and in consequence, an attempt to coordinate them into groups of either generic or subgeneric standing, is rather difficult and at present not entirely satisfactory. This is somewhat similar to the condition we have in the Micropezinae, and considerable study will be necessary to satisfactorily determine the status and validity of these groupings. To these the following names have been given, some as genera, some as subgenera.

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[12] He made a lapsus calami in his key. His captions 2 and 3 should be reversed as regards this character.

Calobata Meigen[13] is one of the oldest genera of the Micropezidae and prior to about 1835, and by most students until rather recently, was the recipient of all the species not placed in *Micropeza*. It was originally based on two species, *Musca cibaria* Linn. and *M. petronella* Linn., of which Westwood, 1842, selected the second as the genotype. As I have stated elsewhere, even as late as 1922 Enderlein included under *Calobata* many species belonging to the Taeniapterinae. At present it is restricted to its genotype *Musca petronella* Linneaus, 1762, and two to four other Palaearctic species; characterized by the presence of two to three postsutural dorsocentrals, normal palpi and well developed pterostigma. The claspers are comparatively simple, with filiform fingers directed cephalad.

Calobatella Mik[14] characterized by an elongate, Micropeza-like head. It contains but one, a Palaearctic species, *Calobata longiceps* Loew, 1870.

In *Paracalobata* Hendel, the palpi are much reduced in length, the pterostigma very small and the claspers quite different from those of *Calobata*. I am recognizing this genus as the recipient of several American species.

Compsobata Czerny, originally proposed, apparently,[15] as a subgenus of *Paracalobata* is not markedly different even in its genitalic assemblage. I do not consider it distinct from that genus.

Cnodacophora Czerny, also apparently proposed, with *Compsobata*, as another subgenus of *Paracalobata*, characterized by the normal palpi and well developed pterostigma. Its genitalic assemblage is quite unique. It contains two Palaearctic and one Nearctic species.

All but *Calobatella* are known to me by their genotypes, and those I have considered available for our North American species are, for convenience, treated here as distinct genera.

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[13] Illig. Mag., II, p. 276, (1803). I am retaining the name *Calobata* instead of *Trepidaria* for the same reason given for *Micropeza*.

[14] Wien. Ent. Zeit., XVII, p. 197, (1898).

[15] I use the word "apparently" because it is not clear whether Czerny intended these groups to be two subgenera of *Calobata* or of *Paracalobata*. He placed them immediately following *Paracalobata*, with *Trepidaria* (*Calobata*) following *Compsobata*. Hennig (1936) treats *Compsobata* as a subgenus of *Calobata*.

Distribution.—A group of Holarctic species: sixteen of Palaearctic distribution, and the five here treated, Nearctic. In North America we find them ranging southwards as far as the Upper Austral Zone.

Key to the genera of the subfamily Calobatinae

1. Head much longer than high .... *Calobatella*
   Head globose, at most but slightly longer than high 2
2. At least two postsutural dorsocentrals: vein VI (anal) evanescing at inferior margin of wing. (Palaearctic) .... *Calobata*
   But one postsutural dorsocentral present; vein VI abruptly terminating before margin of wing 3
3. Palpi short, not much longer than broad; pterostigma very small or absent; claspers more or less turgid, directed caudad, with fulcrum, when present situated between their bases .... *Paracalobata*
   Palpi normal, much longer than broad, attaining epistomal margin; pterostigma well developed, as long as posterior crossvein; claspers filiform, directed cephalad; fulcrum situated on metasternum at base of hind coxae .... *Cnodacophora*

PARACALOBATA Hendel

1922. *Paracalobata* Hendel, Deut. Ent. Zeit., 1922, p. 235.
1930. *Paracalobata* Czerny, Lind. Flieg. Pal. Reg., fam. 42, p. 3.
1930. *Compsobata,* Czerny, Lind. Flieg. Pal. Reg., fam. 42, p. 5.
1936. *Paracalobata* Hennig, Konowia, xv, p. 131.

The characteristics of this genus I consider to be those given in the foregoing key. As compared with the genotype, *Musca ephippium* Fabricius, 1794, our species show quite a marked difference in the general development of the claspers, but that alone is not, in my opinion, sufficient grounds for excluding them.

Synonymy.—*Compsobata* was apparently proposed as a subgenus of *Paracalobata,* containing six species of which *Musca cibaria* Linn., 1761, was the first mentioned, and which, in the absence of any prior designation, I am considering the genotype. It was treated distinct from *Paracalobata* because of its short palpi, but my series of *Musca ephippium* does not show these organs much longer than they are in *cibaria* and by no means attaining the epistomal margin. Consequently I cannot recognize *Compsobata* merely on its different genitalic assemblage.

Species of the genus.—Hennig (1936) treated *Paracalobata* and *Compsobata* apparently as subgenera of *Trepidaria* [*Calobata*]. The former is characterized by the long palpi, attaining the epistomal margin; and included the species *ephippium* Linn. and *octoannulata* Strobl, both Palaearctic. *Compsobata* he limited to those species with short palpi, long slender hind femora and with a fulcrum accompanying the claspers. This characterization included the Palaearctic species *Musca cibaria* Linn. 1761, *Calobata femoralis* Meigen, 1826, *Calobata nigricornis* Zetterstedt, 1838, *Calobata dentigera* Loew, 1854, *Calobata nitens* Loew, 1870, *Compsobata commutata* Czerny, 1930, and the Nearctic *Calobata univitta* Walker. The other North American species, *pallipes* Say and *mima* Hennig, he apparently retained in *Calobata*.

In the present paper I recognize four North American species in this genus.

Key to the Nearctic Species of Paracalobata

1. General color ferruginous; fulcrum undeveloped; ovipositor segment compressed laterally basad .... *univitta* Walker
   General color black; fulcrum present 2
2. Claspers with distinct, trigonoid apical lobe, developed cephalad (Fig. 20); ovipositor segment subcylindrical, not auriculate basally; mesonotum almost entirely cinereous (except for a broad lateral stripe); mesopleura also cinereous .... *kennicotti* Banks
   Claspers without such apical lobe; mesonotum more shining as is also the mesopleura 3
3. Claspers very large, almost as large as the globose postabdomen; ovisipositor segment broad, basal angles auriculate; mesonotum more or less finely sculptured, the pollinose vestiture interrupted or narrowly continued across the prescutum hump ....*pallipes* Say
   Claspers much smaller than the postabdomen; ovipositor segment subcylindrical, not auriculate basally; mesonotum smooth, polished, the vestiture broadly continuous across the prescutum hump.
   mima Hennig.

Paracalobata univitta (Walker) (Pl. XII, figs. 15, 16.)

1835. *Calobata agilis* Harris, (nomen nud.) Hitchcock's Rep. Geol. Bot. Zool. Mass., (2), p. 601.
1849. *Calobata univitta* Walker, List Ins. Brit. Mus., Dipt., IV, p. 1049.
1883. *Calobata albiceps* Van der Wulp, Tijds. v. Ent., XXVI, p. 50.

1900. *Calobata univittata* Johnson, in Smith's Ins. N.J., (2), p. 692. [List.]
1901. *Calobata univittata* Chagnon, Ent. Student, II, p. 13. [List.]
1908. *Calobata univitta* Cresson. Trans. Amer. Ent. Soc., XXIV, p. 5.
1910. *Calobata univitta* Johnson, in Smith's Ins. N.J., (3), p. 803. [List.]
1920. *Calobata univitta* Britton, Bull. Conn. Geol. Nat. Hist. Surv., no. 39, p. 205. [List.]
1925. *Calobata univitta* Johnson, Occ. Pap. Bost. Soc. Nat. Hist., VII, p. 265. [List.]
1925. *Calobata univitta* Johnson, Proc. Boston Soc. Nat. Hist., XXXVIII, p. 98.
1926. *Calobata univitta* Leonard, Mem. Cornell Univ., 101, p. 854. [List.]
1936. *Trepidaria* (*Compsobata*) *univitta* Hennig, Konowia, XVI, p. 134.

A very distinctive species and easily recognized by its general ferruginous color, in which respect it differs from all other known North American members of this subfamily. In lacking any developed fulcrum it differs from the other species, and in this respect simulates the European *cibaria*.

Synonymy.—This species has often been recorded *in lit.* as *univittata*, no doubt a lapsus calimi. As regards *agilis*, Johnson (1925.1), listing the species in the Harris Collection now at the Boston Society of Natural History, cites "*Calobata agilis* Say, MS" under *univitta*. The name *agilis* was cited in the list of species recorded by Harris as occurring in Massachusetts, but no author nor description was given. Johnson records both sexes in the Harris Collection from Milton and Cambridge, collected in 1828 and 1835, and these are probably the oldest specimens of this species in extant, at least in North America. The synonymy of *albiceps* has been recorded by Hennig (1936) with a query, but I have no reason to question this treatment.

Diagnosis.—Pale yellow to ferruginous; a metanotal spot, subapical ring on hind and sometimes on mid femora, brownish; sometimes one to three mesonotal stripes (rarely these fused together) and abdominal tergites, are black to brown; ocellar tubercle and arista also black.

Vertex angles, anterior orbits of frons, face, bucca, postbucca and lower part of pleura, niveous. Occiput, mesonotal disk, scutellum, upper part of pleura, metanotum and more or less of abdomen, slightly cinereous, leaving the lateral margins of mesonotum including notopleura, most of abdomen, and legs, shining to polished.

Claspers (Figs. 15, 16) rather large, turgid, their apices curving caudomesally as broad hooks; their bases contiguous without any exerted fulcrum extruding nor concealed, and their mesal margins densely setose. Ovipositor segment somewhat subcylindrical but becoming laterally fattened in drying, with a ventral basal cavity having sharp lateral margins (for the reception of the apical hooks of claspers).

Length: 6 to 7 mm.

Distribution.—The range of this species seems to be the northern portion of North America; probably its southern limits is that of the Austral Transition zone. Its known range is from Quebec southwards to Pennsylvania and westward to British Columbia and Utah.

It was originally described from New York and St. Martin's Falls, Albany River, Hudson Bay; type probably in the British Museum (Natural History). It was next recorded as *agilis* Say MS from Massachusetts, then from Quebec as a new species, *albiceps* van der Wulp, and since then we have records by Johnson (1900 and 1910) from New Jersey; by Chagnon (1901) from Montreal; Britton (1920) from Connecticut; Johnson (1926) from the New England States. Hennig (1936) gives additional records from New Jersey, New York, and Pennsylvania; also from South Carolina, Iowa and California.[16] It is known to me from the following:

Specimens examined: 171.

CANADA: All [Can.] unless otherwise noted. British Columbia.—Agassiz, V 31, (R. Glendenning), [1♀]. Oliver, VIII 18, (C. B. Garrett), [1♀]. Victoria, VI 14, (K. F. Auden), [1♀]. Manitoba.—Aweme, VII 1, (R. D. Bird), [1♂]. Portage la Prairie, VII 2, (A. J. Hulter), [1♂]. Ontario.—Hawkstone, VI 28, (C. H. Curran), [2♂]. Island Park, VI 9, (J. S. Milne), [1♂]. Kearney, VII 8, (E. P. Ide), [1♀]. Lobo, V 29, (A. A. Wood), [1♂]. Moosonee, VII 16, (G. S. Walley), [1♀]. Niagara Glen, VI 10, 24, (G. S. Walley), [3♂]. Orellia, VI 21, (C. H. Curran), [1♂, 1♀]. Ottawa, VI 2, 5, (Ide & Curran), [3♂, 1♀]; VI 12, (Gibson), [U.S., 1]. Point Pelee, VI 3, (G. S. Walley), [1♀]. Putnam, V 28, (G. S. Walley), [1♂]. St. Davids, VI 11, (G. S. Walley), [1♀]. Vineland Station, VI 2, (W. Putnam), [1♀]. Waubamik, VI 15, (H. S. Parish), [Mel., 1♀]. Quebec.—Covey Hill, VI 15, 17, 18, 24, VII 1, (Walley, Curran), [4♂, 1♀]. Fairy Lake, VI 1, (W. J. Brown), [2♀]. Hull, V 30, VI 5, VIII 13, (C. H.

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[16] I rather doubt the determination from these last three states. The last two may be of *mima*, but I cannot suggest what he may have had from South Carolina.

Curran), [2♂, 1♀]. Knowlton, VI 20, VII 9, (G. S. Walley, L. J. Milne), [2♂, 1♀]. Knowlton City, VI 23, (G. S. Walley), [1♂, 1♀]. La Prairie, VI 14, (W. J. Brown), [1♂]. Megantic, VI, (C. H. Curran), [2]. Patton Springs, VII 4, (J. A. Adams), [1♀]. Chambly County, VI 15, [Kans., 1]. Montreal Island, VI 11-VII 29, [Kans., 2].

New Hampshire: Dolly Cap, White Mountains, VII 13, [Mel., 2]. Grafton Co.—Lost River, Kinsman Notch, White Mountains, VII 7, [Mel., 1].

Massachusetts: Suffolk Co.—Boston, VI, [Mel., 1♂]: Forest Hills, V 28, (H. Parshley), [Adams, 2]. Barnstable Co.—Woods Hole, [Mel., 1♂].

Connecticut: Tolland Co.—Storrs, Eagleville, VI 6, [Mel., 1♂, 1♀]. Fairchild Co.—Redding, V 31, VI 10, 11, [Mel., 3♂, 1♀].

New York: Hamilton Co.—Sport Island, Sacandaga River, VI, (C. P. Alexander), [C.U., 1♂]. Tompkins Co.—Ithaca, VI 5, 20, [C.U., 2♂, 7♀]; V 31, [Mel., 5]; VI 9, [Kans., 3]. Westchester Co.—Pocantico Hills, VI 27, (C. W. Sabrosky), [Sab., 1♀]. New York.—Van Cortland Park, VI 6, 26, [Mel., 1♂, 1♀]. Nassau Co.—Sea Cliff, V, [Kans., 1].

Pennsylvania: Roxborough, Philadelphia, VI 10, (G. M. Greene), [Kans., 1].

Maryland: Montgomery Co.—Cabin John, VI 20, [Mel., 1♀].

Michigan: Cheboygan County, VII 27, (C. W. Sabrosky), [Mich. A., 1♀]. Kent Co.—Grand Rapids, VII 1, (E. Hansen), [Sab., 1♂]. Ingham Co.—East Lansing, VI 20, (H. E. Milliron), [Sab., 1♀]: Mason, V 22, (C. W. Sabrosky), [Sab., 1♂].

Minnesota: All [Minn.]. Hennepin Co.—V 25, (A. A. Nichol; in poplar woods), [1♀]; VII 13-14, (W. E. Hoffmann), [1♂]: Lake Calhoun, VI 12, (W. E. Hoffmann), [1♀]: M[innea]p[o]l[i]s, VI 7, [1♀]. Scott Co.—VI 6, [1♀].

North Dakota: Cass Co.—Fargo, VI 13, [U.S., 1].

South Dakota: Brookings Co.—Brookings, (J. M. Aldrich), [U.S., 1]. Grant Co.—Big Stone City, VI 8, [U.S., 1].

Iowa: Story Co.—Ames, V 22, (G. S. Walley), [Can., 1♂].

Illinois: All [Ill.]. Stephenson Co.—Freeport, VII 4, [1]. McHenry Co.—Algonquin, VI 16, VII 1, [44]. Ogle Co.—Oregon, VI 19, [1]. Champaign Co.—Homer, VI 4, [1]. Mahomet, V 18, [1].

Ohio: Franklin Co.—Columbus, VI 5, (R. H. Painter), [Painter, 7]; V 11, 18, (D. S. Whelan), [Mich. A., 3♂, 2♀].

Montana: Powell Co.—Goldcreek, VII 29, (A. L. Melander), [Mel., 1♀].

Wyoming: Larva Creek, Yellowstone National Park, VII 5, (A. L. Melander), [1♂].

Colorado: Marysville, VI 18, (T. D. A. Cockerell), [Col. A., 1♂].

Idaho: Bonner Co.—Priest Lake, VIII 1, (A. L. Melander), [Mel., 1♂]. Latah C.—Moscow, (J. M. Aldrich), [U.S., 1].

Washington: All (A. L. Melander), [Mel., 5♂, 4♀]. Snohomish Co. —Big Four Mt., VII 5, Asotin Co.—Asotin, V 11, 16. Skagit Co.—Mount

Vernon, VII 3. Spokane Co.—Valleyford, V 17, 29, VII 19. King Co.—Vashon, V 28.

OREGON: Umatilla Co.—Hermiston, VII 9, (A. L. Melander), [Mel., 1♀].

UTAH: Cache Co.—Logan, X 20, (D. E. Hardy), [Utah, 1♀].

NEVADA: Washoe Co.—Sparks, VI 23, (E. P. Van Duzee), [Cal., 3♀].

Paracalobata pallipes (Say) (Pl. XII, fig. 17.)

1823. *Calobata pallipes* Say, Jour. Acad. Nat. Sci. Phila., III, p. 97.
1830. *Micropeza pallipes* Wiedemann, Ausser. Zweifl. Ins., II, p. 548.
1878. *Calobata pallipes* Osten Sacken, Cat. Dipt. No. Amer., (2), p. 180. [List.]
1896. *Calobata pallipes* Slosson, Ent. News, VII, p. 263. [List.]
1908. *Calobata alesia* Cresson, Trans. Amer. Ent. Soc., XXXIV, p. 6, pl. 1, figs. 5, 6. (?Syn. by Hennig, 1936.)
1925. *Calobata pallipes* Johnson, Occ. Pap. Bost. Soc. Nat. Hist., VII, p. 265. [List.]
1926. *Calobata pallipes* Leonard, Mem. Cornell Univ. 101, p. 854. [List.]
1936. *Trepidaria pallipes* (Hennig), Konowia, XV, p. 134.

This and the following species are not typical in that the legs are less elongate and there is a well developed fulcrum between the claspers. It is distinguished from *mima* by the shining but finely roughened mesonotum which is not pruinose medianly nor very much anteriorly. The large entirely yellow claspers and the broad, auriculated base of the ovipositor segment are also differentiating characters.

Whether or not this is *pallipes* of Say will probably never be known. Say described *pallipes* from Missouri by characters which apply as well to both *mima* and *Cnodacophora nasoni.* Say's statement " front . . . . yellowish-white " applies well to *nasoni,* while " Thorax with a whitish line each side before the wings " is more in agreement with the present form and *mima* but not so well to *nasoni.* Were it not for the latter statement I would unhesitatingly apply Say's name to *nasoni.* As the present form has been considered *pallipes* or its synonym *alesia* Walker by me in my earlier paper on this family, I am adhering to this treatment.

Wiedmann (1830) referred this species to *Micropeza* in which he was followed by Osten-Sacken in his catalog of 1858, and we also find in LeConte's writings of Say's (1859) Osten-Sacken's note that this is a *Micropeza.* However Osten-Sacken returns it to *Calobata* in the 1878 edition of his catalogue, in which genus it has remained until the present.

Calobata alesia Walker, described from St. Martin's Falls, Albany River, Ontario, may be either *pallipes*, *nasoni*, *mima* or *kennicotti*, all of these species occurring in about that region. The original description is so lacking in important characters that it is impossible to apply the name to any one of these species. I used the name in 1908, for the present species, following Johnson's determinations. It was not synonymized until 1936, by Hennig, however, with a query. As the status of *alesia* is doubtful, I am not including its bibliography under *pallipes* when ever the synonymy is not certain. This is given in the footnote below.[17]

Diagnosis.—♂. Black; pale yellow to tawny as follows: anterior third of frons, bucca, oral margin, antennae, claspers, fulcrum and more or less of the modified sixth sternite, legs including coxae excepting the brown preapical rings on hind femora and basal half of hind tibiae. Arista black. Halteres white. Wings immaculate, hyaline with pale veins.

Pollinosity cinereous to niveous, leaving following polished surfaces: posterior orbits, mesonotum except upper pleural stripe, mesopleura, most of abdomen and genital segments; mesonotal gloss somewhat subdued by the fin rugulose sculpturing of the surface, leaving the lateral margins and rarely completely across anterior margin, pollinose.

Head slightly longer than high. Aista sparingly pubescent. Claspers very large, turgid (in general form as of *mima* figures 18 and 19), strongly curved laterad then recurving mesad, their apices provided with expanded, pad-like lobes; their thickness just before the expanded apices at least as broad as the hind femur; their bases widely separated, between which protrudes the transversely lobed fulcrum. The pale sternite V with widely separated apical dentures.

♀. Similar with antennae, mid and hind coxae more or less infuscated and the femora with much of the extensor surface brown. Ovipositor segment (Fig. 20) very broad, somewhat trigonoid in cross section, with lobate (auriculate) lateral basal angles and the usual ventral basal cavity for accommodation of the claspers.

Length: 5.5 to 6.5 mm.

Distribution.—This species has apparently the same range as *univitta*. It was originally described from Missouri and the type is supposed to have been destroyed with the Say Collection. Osten-Sacken in his 1878 catalogue records the species from Hudson Bay Territory, but this material is very probably what has since been described as *kennicotti.*[18] As many of the published records of this species or its possible synonym *alesia*, may be misidentifications of *nasoni* and *mima*,[19] we cannot mention them here, but I feel that we can note Slosson's record (1896) from Mount Washington, New Hampshire; Johnson's (1925) from several New England states; Leonard's (1926) from numerous localities in New York; and my own record (1908) as *alesia* from New Jersey and northern Illinois.

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[17] *Calobata alesia* Walker, List Ins. Brit. Mus., Dipt., IV, p. 1048, (1849). Osten-Sacken, Cat. Dipt. No. Amer., (1), p. 80, (1858); Cat., (2), p. 179, (1878). [New England.] Johnson, in Smith's Ins. N. Jer., (2), p. 692, (1900); Ins. N. Jer., (3), p. 803, (1910). Britton, Bull. Conn. Geol. Nat. Hist. Surv., no. 39, p. 204, (1920).

Specimens examined: 192.

ALASKA: Anchorage, VI 13, (J. M. Aldrich), [U.S., 1♂].

CANADA: All [Can.] unless otherwise noted. Manitoba.—Aweme, VI 27, (E. Criddle), [A.N.S., 1♂, 1♀]: Selkirk, VI 10, 11, (J. B. Wallis), [2♂, 1♀]: Treesbank, (Criddle), [U.S., 1]. Ontario.—Bathwell, VI 14, (L. J. Milne), [2♀]. Delhi, VI 2, (G. S. Walley), [1♂, 1♀]: Orillia, VI, (C. H. Curran), [1]: Prince Edward County, VII 2, (Evans), [1♂, 1♀]: Strathroy, VII 15, (H. F. Hudson), [1♀]: Toronto, V 16, [Mel., 1♀]: Whitby, VII 6, (C. H. Curran), [1♂]. Quebec.—Gracefield, VI 10, (O. Peck), [1♂, 1♀]: Karubazua, VI 6-10, (W. J. Brown), [1♀]: Knowlton, VI 21-22, 29, (G. S. Walley), [5♀]: Knowlton Landing, VII 10, (W. J. Brown), [4♂, 8♀]: St. Chrysostome, VI 28, (G. S. Walley), [1♂]. New Brunswick,—Barberd, VI 25, (J. D. Tothill), [6♂, 3♀].

VERMONT: Caledonia Co.—Lyndon, VI 13, (A. L. Melander), [Mel., 1♀].

MASSACHUSETTS: Essex Co.—Beach Bluff, VI 25, (H. M. Parshley), [Adams, 1]. Suffolk Co.—Forest Hills, V 20, (H. M. Parshley), Adams, 1].

NEW YORK: Tompkins Co.—Dryden Lake, VI 16: McLean, V 25: [all C.U., 2♂].

PENNSYLVANIA: Delaware Co.—Swarthmore, V 7, VI 7, (E. T. Cresson, Jr.), [A.N.S., 1♀, 1♀, det. 1908 as *alesia*].

NEW JERSEY: "N. J.", [A.N.S., 1♂, 2♀].

MICHIGAN: All (C. W. Sabrosky) and [Sab.] except as noted. Midland Co.—Midland, VI 6, [2♂, 1♀]. Lapeer Co.—13 miles north of Lapeer, V 30, [36♂, 22♀]. Kent Co.—Alto, VIII 7, (E. J. Campan), [1♀]: Grand Rapids, VI 22, 29, (E. Hansens), [2♂]. Allegan Co.—Douglas Lake, VIII 3, (Martin), [Kans., 1♀]. Ingham Co.—East Lansing, V 17, [1♀]: Mason, V 22, [4♂, 1♀]. Hillsdale Co.—Somerset Junction, V 30, [9♂, 7♀].

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[18] See under that species.

[19] See footnote 17 for references to records of *alesia*.

MINNESOTA: All [Minn., 9♂, 6♀]. Wadena County, VI 26, (W. Carter; on alfalfa). Todd Co.—Eagle Bend, VII 5, (W. E. Hoffmann). Hennepin Co.—V 20, 27, (A. A. Nichol; tamarak swamp; basswood and maple). Lake Calhoun, VI 12, (W. E. Hoffmann): Minneapolis, V 27, (W. E. Hoffmann): Crystal Lake, V 29: Fort Snelling, VI 11, (A. A. Nichol). Ramsey Co.—St. Paul, V 25, (S. Kemperley): Bussey's Pond, St. Paul, VI 6, (W. E. Hoffmann): Battle Creek, St. Paul, V 20, (W. E. Hoffmann).

NORTH DAKOTA: Bottineau Co.—Turtle Mts., near Bottineau, VII 21, [U.S., 1].

SOUTH DAKOTA: Brookings Co.—Brookings, VI 10, (J. M. Aldrich), [U.S., 1]. Pennington Co.—Hill City, [Kans., 1].

NEBRASKA: "Neb"., [Mel., 1♀].

KANSAS: Riley Co.—Manhattan, V 21, 26, (C. W. Sabrosky), [Sab., 1♂, 2♀].

ILLINOIS: N[orthern] Ill[inois], [A.N.S., 1♂]. McHenry Co.—Algonquin, V 28, VI 15, [Ill., 7]: McHenry, VI 25, (A. L. Melander), [Mel., 1♀]. Cook Co.—Chicago, VI 8, 30, [Ill., 1; Mel., 1♂]. Carroll Co.—Savanna, VI 14, [Ill., 1]. Champaign Co.—Champaign, V 28, (Martin), [Ill., 3]: Kings Mill, V 18, [Ill., 1].

WYOMING: Laramie Co.—Horse Creek, VIII, [Kans., 1].

COLORADO: Boulder Co.—Boulder, VI 8, 25-30, VII 20, (M. James): Asuc Lodge, Boulder, VII 1, (M. James): [all Col. A., 4♂, 5♀].

Paracalobata mima (Hennig) (Pl. XII, figs. 18, 19, 20.)

1936. *Trepidaria mima* Hennig. Konowia, xv, p. 134, fig. 10.

A species very similar to *pallipes*, differing most noticeably as follows:

Head slightly more elongate; the black of the mesofrons more extensive, generally broadly attaining the lunular margin. The shining surface of the mesonotum smooth, polished, giving a high gloss, and the pollen often extending across the prescutal hump. Claspers (Figs. 18, 19) smaller, more slender, the portion just basad of the expanded apex scarcely as thick as the hind femur; the fulcrum conspicuous and is also more slender with its apical knob more distinctly bilobate. Ovipositor segment (Fig. 20) subcylindrical but usually somewhat laterally compressed apically, not much broader basally than the apex of tergite VI, without any lobate lateral angles. Some individuals show considerable darkening of the antennae and proboscis.

Distribution.—A western species, limited eastward by the Mississippi Valley.

The typical series consisted of six males and three females from "Elektra Lake,[20] Colorado; Banff, Alberta, and Washington

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[20] Probably a misspelling for Electra Lake.

Territory". No type was selected nor designated. I herewith select as the lectotype, a male from Electric Lake, La Platte County, Colorado, alt. 8400 feet, [American Museum of Natural History].[21] The other specimens automatically become paratypes. The species has not since been recorded from any other locality. I have seen the following material:

Specimens examined: 205.

CANADA: All [Can.] except as noted. British Columbia.—Merritt, VIII 3, (L. D. Anderson), [Kans., 1♂, 1♀]: St. Marys, VII 12, (A. A. Dennys), [2♀]: Shuswap Lake, VII 22, (J. McDunnough), [1♂]. Alberta.—Banff, VI-VIII, (C. D. Garrett), [28]: VI 7, (R. C. Osburn), [Ohio, 1♀]: Jasper, VII 25, (J. McDunnough), [1♀].

MONTANA: Lake McDonald, Glacier National Park, VII 14, (A. L. Melander), [Mel., 1♀].

WYOMING: Yellowstone National Park.—Several stations, VII 5-28, (A. L. Melander): Lower Geyser Basin, VII 25, (V. Argo): Yellowstone Lake, VIII 8 (A. L. Melander): [all Mel. 2♂, 12♀]. West Yellowstone, VI 16, (E. C. Van Dyke), [Cal. 1♂].

COLORADO: Pueblo Co.—Pingree Park, Larimer, VIII 14-19, (M. James): VIII 22, (R. H. Beamer), [Col. A., 1♀ : Kans., 1♂]. Boulder Co.—Longs Peak, 9000 ft. alt., VII 14, (E. C. Van Dyke), [Cal., 2♂, 2♀]. Gilpin Co.—Tolland, VII 10, (M. James), [Col. A., 1♀]. Jackson Co.—Walden, VIII 20, (R. H. Beamer), [Kans., 1♂]. Park Co.—Geneva Park, Grant, 10,000 feet alt., (L. O. Jackson), [Biol., 1]. Saguache Co.—Marshall Pass, VII 28, [U.S., 1]. Lake Co.—Tennessee Pass, VII 10, 12, 24, (J. M. Aldrich), [U.S., 9]. La Plata Co.—Electric Lake, 8400 ft. alt., [Am.M.N.H., 28 spms.].[21]

IDAHO: Bonner Co.—Priest Lake, VIII 1, (A. L. Melander), [Mel., 1♂]. Latah Co.—Avon, VII 26, (A. L. Melander), [Mel., 1♂]. Franklin Co.—Franklin, VII 17: Preston, VII 11: Whitney, VII 2: (all G. F. Knowlton), [all Utah, 7♂, 2♀].

Smithfield, VII 7, (F. C. Harmston), [Utah, 1♂].

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[21] When studying this family I had a series of twenty-eight specimens from Electric Lake. I had then drafted a description of this species adopting the name *mima*, and returned the specimens so labelled, type and paratypes, to the American Museum of Natural History from whom I had borrowed them. Other specimens I had at the time from several collections had been returned to their respective owners, determined under this name. Because of an interruption in my study of this family, this description was never published. Fortunately, the determinations will hold, but the date given on my labels will antedate that of the species.

[22] I am assuming that this series contain the lectotype, paratypes and topotypes.

WASHINGTON: Lincoln Co.—Creston, VI 22, (A. L. Melander), [Mel., 1♀]. Whitman Co.—Pullman, VI 4: Rock Lake; (all A. L. Melander), [all Mel., 1♂, 1♀]. King Co.—Northland, VII 9, (E. P. Van Duzee), [Cal., 1♂, 5♀]: Seattle, VII 15, (R. C. Osburn), [Ohio, 1♂].

Diamond Lake, VI 15, (A. L. Melander), [Mel., 2♀].

OREGON: All [Kans.] except otherwise noted. Union Co.—North Powder, VII 13, (J. Nottingham), [3♀]. Baker Co.—Haines, VII 10, (R. H. Beamer), [36♂, 20♀]. Klamath Co.—Eagle Ridge, Klamath Lake, VI 24, (C. L. Fox), [Cal., 3♂, 1♀].

NEVADA: Elco Co.—Wells, VII 2, [U.S., 1].

UTAH: Cache Co.—Logan, VII 18, (E. P. Van Duzee), [Cal., 2♂, 2♀]: White Pine Lake, 8000 ft. alt., Logan, VII 15, (E. P. Van Duzee), [Cal., 3♂, 3♀]: Logan Canyon, VI 20, VIII 15, (R. E. Nye, Knowlton, Harmston), [Utah, 2♀]. Weber Co.—Eden, VII 10, (D. E. Hardy), [Utah, 1♂, 1♀].

Emigrant Canyon, VII 26, [U.S., 1]. Linden, VII 6, (G. F. Knowlton), [Utah, 1♂].

CALIFORNIA: Eldorado Co.—Bijou, Lake Tahoe, VI 30, (R. L. Usinger), [Cal., 1♀]. Placer Co.—Lake Tahoe, VI 23, (E. H. Nest), [Cal., 1♂, 1♀]. Nevada Co.—Truckee, VII 6, (E. P. Van Duzee), [Cal., 2♂, 2♀].

Fraser, VII, (Johnson), [U.S., 1]. Pine Lake, (Johnson), [U.S., 1].

Paracalobata kennicotti (Banks) (Pl. XII, fig. 21.)

1926. *Calobata kennicotti* Banks, Psyche, XXXIII, p. 43.
1936. *Trepidaria kennicotti* Hennig, Konowia, xv, p. 136.

In placing this species here I am influenced by its general similarity to *pallipes*, its turgid claspers with the poorly developed fulcrum between them. With the aid of drawings and notes kindly furnished me by Dr. Nathan Banks, I tentatively placed the species in the present genus, but was unable to assign it more definitely. Fortunately, on a visit to the Museum of Comparative Zoology, this summer (1938), I had the opportunity to examine the type-series which enabled me to satisfactorily place the species.

Very similar to *pallipes* and *mima,* differing from both, as regards the male, in the shape of the claspers, and as to both sexes in the pattern of the thoracic pollinosity.

Diagnosis.—Black; pale, yellow to ferruginous: the cephalic half of frons, ventral third of paracephalon, humerus, postalar callus, postabdomen and claspers; legs as in *pallipes* but no extensor infuscation on femora.

Vestiture as in *pallipes* but the white pollinosity covers most of the mesonotum except a broad lateral stripe from humerus to postalar region which is bare and shining; the mesopleura is also cinereous.

Structurally similar to *pallipes* but legs more slender. Claspers (Fig. 21) turgid as in that species but smaller, and the mesally curved apices are more definitely bilobed, not pad-like, with the cephalic lobe elongate, acutely trigonal, in lateral aspect, slightly longer than width at base, (suggesting a finger-like development as in *nasoni*), and is somewhat pilose; the caudal lobe is much shorter and rounded. A bilobed fulcrum is present between the bases of the claspers, but is very short and not visible in lateral aspect. Ovipositor segment of female is rather cylindrical basally, as in *mima*, not auriculate.

Distribution.—This species is known only from the type-series of one male and two females in the Museum of Comparative Zoology. The type is the male bearings labels "H[udson] B[ay] T[erritories]", "Loew Coll.", "pallipes Say", "Type no. 15672". One of the paratype females is on the same pin with the type; the other female is labeled "H.B.T." "323", "Osten-Sacken Coll."

These specimens are possibly part of the series upon which Osten-Sacken based his record of *pallipes* from Hudson Bay Territories [23] and which is probably part of the collection made by Robert Kennicott at the Red River of the North, as mentioned by Osten-Sacken in his Record.[24] This region is in Manitoba.

CNODACOPHORA Czerny

1930. *Cnodacophora* Czerny, Lind. Flieg. Pal. Reg., fam. 42, p. 4.

This genus is characterized by the distinct separation of vein II, which enters the costa some distance beyond vein I, thus forming a distinct pterostigma. In addition we find a very characteristic genitalic assemblage. The claspers are filiform organs curving cephalad, apparently modifications of the fourth and fifth sternites; the basal portion being the fourth sternite to which is fused the filiform modification of the fifth. The fulcrum is a subconical appendage on the metasternum produced caudad between the hind coxae.

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[23] Catal. Dipt. No. Amer., (2), p. 180, (1878).

[24] Record of My Life Work in Entomology, p. 94, (1903).

GENOTYPE: *Calobata adusta* Loew, 1870. (Present designation.)[25]

Cnodacophora nasoni (Cresson) (Pl. XII, fig. 22.)

1914. *Calobata nasoni* Cresson, Ent. News, xxv, p. 459.
1936. *Trepidaria (Cnodacophora) nasoni* Hennig, Konowia, xv, p. 133.

This is not *adusta* Loew as there is no infuscation at the apex of the wings. I do not know the other European species, *stylifera*, to which, from its description, *nasoni* seems to agree except for slight difference in the pattern of the mesonotal pollinosity and color of the antennae and legs. However, as the species of this subfamily are very homogeneous, differing in comparatively insignificant features, I hesitate to consider the synonymy.

There seems to be two forms in this species, but I have not sufficient material to satisfactorily determine the value of the differentiating character; furthermore, the females are apparently inseparable. This character is, that the base of the finger-like claspers is apparently membraneous in the typical form, the fingers seemingly produced from the ventral membrane, and the second and third sternites are not well developed but are submembraneous. In the other form the fingers have a broad chitinized base, basad of which is the third sternite. Among other variations within the species we find some individuals with two notopleurals, a character more common in *Paracalobata.*

Diagnosis.—For the most part a black species and in this respect similar to *Paracalobata pallipes.* Pale yellow to ferruginous are: the mesofrons cephalad of the ocelli, frontal orbits cephalad of the posterior frontal bristle, face, oral margin, postbucca, antennae, palpi, humeri sometines, halteres, legs including coxae except subapical infuscation on mid and hind femora, venter of abdomen and the attached genital appendages, some sclerites of the genital segments, and wing veins. Arista black. Wings entirely immaculate, hyaline. Tibiae particularly the hind ones more or less brownish.

Mostly shining with cinereous to niveous vestiture which sometimes almost obscures the gloss. Paracephalon polished as it also the mesonotum except the cinereous design as follows: A broad median postsutural stripe continuing narrowly cephalad but not attaining prescutal hump, and branching laterally at about the suture, these branches arching toward but not attaining humeri; the broad stripe dilating caudad and continuing over on to the scutellum; the lateral margins including notopleura and supra-alar and post-alar calli, also cinereous. This pattern is quite variable; in the recessive condition the cephalic continuation and the branches are much abbreviated and sometimes not developed; in the intensive condition the mesonotum may be covered except broad sublateral bare stripes interrupted at the suture. All intergradations exist. Abdominal tergites completely cinereous in certain aspects.

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[25] The name *Cnodacophora* was given to a group of two species, *Calobata adusta* Loew and *Calobata stylifera* Loew, 1870. I do not find that any designation of the genotype has heretofore been made.

Head slightly longer than high with well developed paracephalon. Eyes with vertical axis, their postorbits almost dorsoventrally straight. Two small frontals, the anterior one sometimes very weak. Arista plumose basally; palpi attaining epistoma. One (posterior) notopleural, rarely two; pleura and particularly the pectus pale pilose as are also lateral margins of abdomen. Claspers and filiform fulcrum as figured (Fig. 22); except in the typical form there is no chitinized base to the fingers and the sternites II and III are not so definitely marked.

Distribution.—I find this species occurring in the central and northwest portions of the United States, in Canada as far east as the Providence of Quebec, and in New York State. It was originally described from Algonquin, Illinois; (type, ♂, Acad. Nat. Sci. Phila., no. 6078). It is known to me from the following localities:

Specimens examined: 44.

Alaska: All (J. M. Aldrich), [U.S., 6]. Anchorage, VI 13; Fairbanks, VI 29; Nemara, VI 28; Camp 322, Alaska Engineer. Commiss., VII 12.

Canada: Alberta.—Banff, VI–VIII, (C. D. Garrett): Lethbridge, VI 19, (J. H. Peppe), VI 26, (W. Carter): [all Can., 4]. Saskatchewan.—All [Can., 2♀]; Forked River, VII 13, (E. Criddle): Prince Albert, VII 27. Manitoba.—Aweme, VIII 11, (N. Criddle), [Can., 1♀]. Ontario.—Moosonee, VII 17; (G. S. Wallay), [Can., 1♂]. Quebec.—Megantic, VI, (C. H. Curran), [Can., 2]: Sanford, VI, (C. R. Crosby), [C.U., 3].

New York: Tompkins Co.—Ithaca, VI 9, [C.U., 1].

Wisconsin: Polk County, VII, (Baker), [U.S., 1].

Minnesota: Olmstead County, VI, (C. N. Ainslie), [Minn., 1♂].

Illinois: McHenry Co.—Algonquin, (R. A. Nason), [A.N.S., 3♂, 2♀] type and paratypes]: V 27, VI 19, [Ill., 4].

Wyoming: Sheridan Co.—Sheridan, (Metz), [U.S., 1].

Colorado: La Plata Co.—Electric Lake, 8400 ft. alt., VI 28, [AM.M., 1].

Idaho: All (J. M. Aldrich), all [U.S., 3]. Latah Co.—Moscow, V 17: Viola, VI 26.

Washington: Whitman Co.—Almota, V 11: Pullman, VI 1, 14: Rock Lake: Wawawai, V 20: (all A. L. Melander), [all Mel., 4♂, 4♀].

Subfamily TAENIAPTERINAE

1922. Calobatinae Enderlein (in part), Arch. f. Naturg., LXXXVIII, A, p. 141.
1927. Tanypodinae Frey, Notul. Ent., VII, p. 67.
1930. Taeniapterinae Cresson, Trans. Amer. Ent. Soc., LVI, p. 317, (Sept).
1930. Rainieriinae Czerny, Lindner Fl. Pal. Reg., fam. 42, p. 11, (Oct).

As I have mentioned under Calobatinae, Enderlein apparently had no logical conception of the characters of these two subfamilies. There can be no question as to the proper name for this subfamily. We cannot use Tanypodinae as *Tanypoda* is not available as a generic name being synonymous with *Rainieria*, and Taeniapterinae has priority over Rainieriinae.

As distinguished from *Calobata* and *Micropeza*, *Taniaptera* certainly belongs to a separate subfamily, the limits of which are not difficult to establish if the male genitalia are considered and which are substantiated by other fairly well defined characters.

Subfamily diagnosis.—Head rotund to vertical in profile, not noticeably longer than high; paracephalon not conspicuous; frontal areas generally well defined (at least as regards our species). The bristle-bearing narrow frontalia attenuating anteriorly and forced mesally from the orbits by the well defined parafrons, causing the mesofrons, generally, to assume a fusciform shape (except in *Grallipeza*). The lunule is not produced but often noticeable as polished scales at bases of the antennae. Face short, generally broader than long; clypeus well developed and generally projecting. Thorax more or less narrowed and produced anteriorly, with the fore coxae far removed from the middle pair; and there is a well developed comb of long bristles at the posterior margin of the sternopleura above the mid coxae. The genital assemblage (Fig. 31) is much less developed than in the other two subfamilies; the apical segments of the abdomen in the male are laterally compressed, while the claspers are situated beneath the fifth tergite towards the apex of the abdomen, rarely undeveloped, and have a relatively cylindrical base, becoming bifid to quadrifid to form the fingers, sometimes similar to those found in some species of *Micropeza*. Mid and hind tibiae with distinct extensor setulae; and basal segment of hind tarsi without flexor pencil of hairs. Basal cross-vein present (discal and basal cells complete).

Distribution of species.—Of the 213 species of this subfamily occurring in the Americas, according to Hennig,[26] only four are typically Nearctic. However three of the Neotropicals come within our limits in southern Florida and southern Texas so that seven are treated in this revision.

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[26] Konowia, xv, p. 231, (1936).

The genera occurring within our limits may be separated as follows:

Key to the Near North American Genera of the Taeniapterinae

1. Anal cell long, with its apical (crossvein) vein more than one-half as long as the antepenult section of vein IV; third antennal segment elongate; wings infuscated with a subapical lunate hyaline band. (Taeniapterini) .... *Taeniaptera* Macquart
   Anal cell short, not as long as described above; third antennal segment short, ovate (Rainieriini) 2
2. Clypeus rather pointed with one or two short setae at tip; post-verticals absent; arista bare .... *Hoplocheiloma* Cresson
   Clypeus without such setae 3
3. Opaque mesofrons broadly attaining lunular margin; two post-dorsocentrals; third costal section as long as second; ferruginous species with dark abdomen .... *Gralipeza* Rondani
   Opaque mesofrons strongly attenuated cephalad 4
4. Medifacies very broad, flattened and setose and widely separating the antennae; third costal section much shorter than ultimate of vein IV; large (13 mm.) species with clear wings .... *Calobatina* Enderlein
   Medifacies not so developed and antennae relatively close together; third costal section nearly as long as ultimate of vein IV. *Rainieria* Rondani

RAINIERIA Rondani

1843. *Rainieria* Rondani, Nuov. Ann. Sci. Nat. Bologna, (1), x, p. 40, pl. 1, figs. 7-9.
1850. *Rainieiria* Rondani, Nuov. Ann. Sci. Nat. Bologna, (3), ii, p. 180.
1856. *Tanipoda* Rondani, Dipt. Ital. Prod., i, p. 116.
1868. *Tanypoda* Schiner, Fauna Austr., Dipt., ii, p. 192.
1926. *Rainieria* Cresson, Trans. Amer. Ent. Soc., lii, p. 268.
1930. *Rainieria* Cresson, Trans. Amer. Ent. Soc., lvi, p. 318.

This genus was erected in Rondani's sixth memoir of Italian Diptera which appeared in the New Annals of Natural Sciences of Bologna as cited above (1843). I cannot find any reference as that given by Hennig[27] of the spelling Rainieiria appearing in 1843, but Rondani in his 1850 observations on species in the Museum at Torino used that spelling.

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[27] Stet. Ent. Zeit., xcvi, p. 57, (1935).

The genus was proposed for one species, *Calobata calceata* Fallen 1820 and this is the genotype by monotypy.

Tanipoda was given to the same generic concept with *Calobata calceata* Fallen as the genotype, and Rondani insisted in the use of this name in all his writings until 1875. Schiner (1864) amended the name to *Tanypoda* and that spelling was used in most references since that date. In 1926 I gave my reason for using *Rainieria* instead of *Tanipoda* or *Tanypoda*, and in 1930 I gave a complete bibliography of the genus with some notes on its characteristics, but erred, following Enderlein [28] and Frey,[29] in attaching too much importance to the bare or pubescent arista.

Diagnosis.—Head (Figs. 23, 24) rotund; vertex normal not conically tuberculose and all vertical bristles present; mesofrons fusciform, terminating cephalad in a fine point, not conspicuously tumerous; parafrons shining, not conspicuously elevated at cephalic margin. Second antennal segment with an inferior seta, at least as long as third segment. Thorax elongate, much longer than high. Claspers (Fig. 25) well developed, simple. Pterostigma well developed, the first vein entering the costa well beyond subcosta; first posterior cell open; anal cell short.

Rainieria antennaepes (Say) (Pl. XIII, figs. 23, 24, 25, 26.)

1823. *Calobata antennaepes* Say, Journ. Acad. Nat. Sci. Phila., III, p. 97. (LeConte's Compl. Works of Say, II, p. 83, 1859.)
1830. *Calobata antennipes* Wiedemann, Auss. Zweifl. Ins., II, p. 546.
1833. *Calobata antennaepes* Harris, Hitchcock's Rept. Geol. Mass., p. 593. [List.]
1835. *Calobata antennaepes* Harris, Hitchcock's Rept. Geol. Mass., (2), p. 100. [List.]
1878. *Calobata antennipennis* Osten-Sacken, Cat. Dipt. No. Amer., (2), p. 179. [Catalog.]
1900. *Calobata antennipes* Johnson, Smith Cat. Ind. N. Jer., (2), p. 692. [List.]
1900. *Calobata atennipes* Slosson, Ent. News, XI, p. 321. [Record for Mt. Washington.]
1908. *Calobata atennaepes* Cresson, Trans. Amer. Ent. Soc., XXIV, p. 6, pl. 1, figs. 7, 8, pl. 2, fig. 9.
1910. *Calobata antennipes* Johnson, Smith Ins. N. Jer., (3), p. 803. [List.]
1920. *Taeniaptera antennaepes* Britton, Bull. Conn. Geol. Nat. Hist. Surv., no. 39, p. 204. [List.]
1922. *Tanypoda antennapes* Enderlein, Arch. f. Naturg., LXXXVIII, A, p. 208.

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[28] Arch. f. Naturg., LXXXVIII, A, p. 197, (1922).

[29] Notulae Ent., VII, p. 70, (1922).

1923. *Taeniaptera (Calobata) antennipes* Champlain and Knull, Ent. News, xxxiv, p. 215.
1925. *Taeniaptera antennaepes* Johnson, Proc. Boston Soc. Nat. Hist., xxxviii, p. 98.
1925. *Taeniaptera antennaepes* Johnson, Occ. Pap. Bost. Soc. Nat. Hist., vii, p. 265. [List.]
1926. *Taeniaptera antennaepes* Leonard, Mem. Cornell Univ., 101, p. 853. [List.]
1930. *Tanypoda antennaepes* Curran, Bull. Am. Mus. Nat. Hist., lxi, p. 82. [Orange Co., N.Y.]
1935. *Rainieria antennaepes* Hennig, Stet. Ent. Zeit., xcvi, p. 63.

This is our common Nearctic Taeniapterine, and is readily recognized by its slender, elongate form, general black color except antennae and legs, with noticeable but faintly banded wings. It should not be confused with the members of the Calobatinae which have similar habitus but are less slender and are quite different in frontal and facial structure.

This species may be found on the bark of trees or on foliage, or flying about in the woods. Say (1923) remarks that the fore legs are comparatively shorter than the others and when in flight are " extended before the head considerably elevated above the plane on which the insect moves, also being constantly vibrated, they assume the appearance of antennae". The whiteness of the fore tarsi makes them all the more conspicuous. A large species, ranging from eight to ten millimeters in length.

Diagnosis.—Black, with the antennae yellow to brown; legs pale with apex of fore femur, disto-median and subapical rings on mid and hind femora, brown; fore tarsi and sometimes base of hind tarsi, white; clypeus large and prominent. Wings (Fig. 26) hyaline with faint infuscation medianly and apically; third costal section nearly as long as ultimate of vein IV.

Head somewhat flattened dorso-ventrally with one or more anterior frontals, and the second antennal segment with long distinct marginal setae below, almost as long as third segment.

Distribution.—Probably a truly Austral species, ranging over south-eastern Canada and the United States east of the Rocky Mountains. Say gives the type locality as " United States", but also mentions it as occurring in Illinois and Philadelphia.

Wiedemann (1830) records the species from Pennsylvania; Harris (1833 and 1935) gives the first records for Massachusetts and Osten Sacken (1878) the first for Maryland and Kentucky; Johnson (1900 and 1910) records it from New Jersey; Britton (1920) from Connecticut; Enderlein (1922) from Georgia; Champlain and Knull (1923) from Eberlys Mill, Pennsylvania, on trees; Johnson (1926) cites it from several localities in New England; Leonard (1926) and Curran (1930) record it from New York; Hennig (1935) gives the first definite records for North Carolina, Missouri and Texas. I cannot vouch for the determination of all these records, but they are for the most part probably correct, although it is possible that some of them may refer to the variety *brunneipes*.

Johnson (1925) in his list of the species in the Harris Collection, records this species from "Milton, on fence and plants, June 20, 1831, Dublin, New Hampshire; Nashua, July 20, 1835." It is not impossible that Say determined these specimens, and, as I mentioned under *Paracalobata univitta*, these are probably the oldest specimens of the species in America.

Specimens examined: 137.

CANADA: All [Can., 5♂, 7♀]. Ontario.—Mer Bleue, VI 25, (G. A. Huggs): Orillia, VIII 5, (H. L. Viereck): Point Pelee, VI 11, (G. S. Walley). Quebec.—Abbotsford, VI 30, (G. Shewell): Aylmer, VI 27, VII 4, 18, (C. H. Curran): Queens Park, Aylmer, VI 12, VIII 11, (Graham, Hutching): Hull, VIII 13, (C. H. Curran): Missisquoi Bay, VII 11, (W. J. Brown). Nova Scotia.—Kentville, VII 4, (R. P. Gorham).

CONNECTICUT: Fairfield Co.—Stamford, VIII 28, [Bromley, 1♀].

NEW YORK: Tompkins Co.—Ithaca, VII 7, 12, [C.U., 1♀; A.N.S., 1♀]. Suffolk Co.—Cold Spring Harbor, VII 2, (A. L. Melander), [Mel., 1♀].

PENNSYLVANIA: All [A.N.S., 7♂, 11♀] except as noted otherwise. "Pa.", [Kans., 1]. Philadelphia Co.—Germantown, VI 4, 18, VII 16, 30, (H. S. Harbeck): Roxborough, VI 7, 27, 31, VII 9. Delaware Co.—Swarthmore, VII 9, 14, 18, 19 (E. T. Cresson). Chester Co.—Falls of French Creek, VIII 10, (F. M. Jones). Montgomery Co.—Lansdale, VII 3, (E. T. Cresson).

NEW JERSEY: Gloucester Co.—Malaga, VI 1, [A.N.S., 1♂].

MARYLAND: D[istrict] of [C]olumbia, VI, [Kan., 1].

MICHIGAN: Kent Co.—Grand Rapids, VII 12, (M.S.C.), [Sab., 1♂]. Ingham Co.—Agricultural College, VII 9, 17, [Mich. A., 1♂, 1♀].

Gaylord, VII 19, [Mich. A., 1♂].

MINNESOTA: All [Minn., 6♂, 19♀]. Norman County, VI 23, VII 11, (A. A. Nichol). Henepin Co.—Minnetonka Lake, Minneapolis, VI 16, (H. H. Knight): Savage Farm, VI 25, (on oak). Ramsey County, VI 9, (A. A.

Nichol). Scott Co.—Jordan, VII 13, (H. H. Knight; sand area). Washington Co.—Lakeland, VI 14, (H. H. Knight). Olmstead County, (C. N. Ainslie; U. of Minn. no. 22, Sub. 47 & 48).

KANSAS: Douglas county, (C. P. Alexander), [Kans., 5]: Lawrence, [U.S., 2]. Leavenworth county, VI 28, (R. H. Beamer), [C.U., 1]: Leavenworth, VI 21, (L. S. Henderson), [Kans., 1♀]. Riley county, VI, [Kan. A., 2]: Manhattan, VI 17, (C. W. Sabrosky), [Sab., 1♂].

MISSOURI: Jackson Co.—Atherton, VI, (C. F. Adams), [Adams., 7].

ILLINOIS: All [Ill., 26]. Jo Daviess Co.—Elizabeth, VII 7. Stephenson Co.—Freeport, VII 4. McHenry Co.—Algonquin, VI 5-10, VII 24. Piatt Co.—White Heath, V 22, VI 12, 18. Morgan Co.—Meredosia, VIII 20. Washington Co. — Du Bois, VIII 9. Champaign Co. — Homer, VI 4: Urbana, VI 5, 10, 26-30, VII 2, 9, (Hart, Martin). Union Co.—Anna, VI 27. Saline Co.—Eldorado, VI 1.

OHIO: All [Ohio, 4♂, 5♀] except as noted otherwise. Median Co.—Medina, VI. Summit Co.—Ira, VI 6, 11. Licking Co.—Newark, VI 27, (R. C. Osburn). Franklin Co.—Columbus, VI 2, (D. S. Whelan), [Mich. A., 1♀]. Madison Co.—London, V 23, (J. S. Hine). Hamilton Co.—Cincinnati, VI 24, (Williams, Osburn).

Onaga, VI 9, [Ohio, 1♀].

VIRGINIA: "Va.", [Kans., 1]. Fairfax Co.—Great Falls, VII 9, (A. L. Melander), [Mel., 1♂].

NORTH CAROLINA: Buncombe Co.—Black Mts., VII 15, (W. Beutenmuller), [C.U., 1].

TEXAS: [Texas], square orange label, "Loew Coll.", [M.C.Z., 1♀]. Eastland county, V 19, (G. O. Wiley), [Minn., 1♂, 3♀]. Travis Co.—Austin, V 4, (R. H. Painter), [Painter, 1]. Brazo county, [M.C.Z., 1♂].

MISSISSIPPI: Bolivar Co.—Benoit, VII 17, (J. S. Hine), [Ohio, 2♂].

ALABAMA: Macon Co.—Tuskegee, VII 22, (R. H. Beamer), [Kans., 1♂, 1♀].

GEORGIA: Prattsburg, VII 25, (L. D. Tuthill), [Kans., 2♀].

FLORIDA: Volusia Co.—Datona Beach, III 26, (Mary Auten; jungle gardens), [Ohio, 1♀].

Rainieria antennaepes var. **brunneipes** (Cresson)

1928. *Taeniaptera brunneipes* Leonard, Mem. Cornell Univ., 101, p. 853. (Nomen nudum.)[30]

1938. *Taeniaptera brunneipes* Cresson, Ent. News, XLIX, p. 76.

I must consider this form merely as a variety of *antennaepes*. It is darker, particularly in the following respects:

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[30] The nomen nudum record of Leonard (1928) is based on material I had determined for Dr. Leonard. at which time the description had been written but due to the interruption in my studies, as mentioned in the fore part of the present paper, the name was not validly published until 1938.

The third antennal segment sometimes black, the usual disto-median ring of the mid and hind femora is broader, extending almost to base, and their metatarsi sometimes as dark as the apical segments.

Distribution.—This variety will probably be found with the typical form. The type [♂, A.N.S.P., no. 6288] and two of the paratypes were collected in a bald eagle's nest, but whether this has any significance, I cannot say as there is no similar habitat given of any other specimens I have seen.

Specimens examined: 19.

CANADA: Ontario.—Waubamic, VI, (H. S. Parish), [Mel., 1♂]. Quebec. —Knowlton, VI 26, (L. J. Milne), [Can., 1♂].

NEW YORK: Oswego Co.—Oswego, VI, [C.U., 1]. Tompkins Co.—Ithaca, VI, [C.U., 1]: McLean, VII 2-3, [C.U., 1].

PENNSYLVANIA: Delaware Co.—Swarthmore, VI 10, 18, VII 4, (E. T. Cresson, Jr.), [A.N.S., 1♂, 2♀, paratypes].

MARYLAND: District of Columbia.—Broad Creek near Washington, V 19, E. G. Vannata; in bald eagle's nest), [A.N.S., 2♂, 1♀, type and paratypes].

VIRGINIA: Arlington Co.—Glencarlyn, V 3, VI 11, (N. Banks), [M.C.Z., 2♂]. Fairfax Co.—Dead Run, V 21, VI 9, [U.S., 2]: Great Falls, V 28, (N. Banks), [M.C.Z., 1♀].

MICHIGAN: Ingham Co.—East Lansing, VI 12, VII 2, 12, (Sabrosky, Milliron), [Sab., 1♂, 2♀].

CALOBATINA Enderlein

1922. *Calobatina* Enderlein, Arch. f. Naturg., LXXXVIII, A, p. 194.
1526. *Meganeria* Cresson, Trans. Amer. Ent. Soc., LII, p. 370. [Syn. by Hennig, 1935.]
1935. *Calobatina* Hennig, Stet. Ent. Zeit., XCVI, p. 36.

The species of this genus are recognized by their unusually large size, ten to twelve millimeters in length. They are separated from the other members of this subfamily by the broad flattened setulose interfoveal area and by the sharp, raised anterior frontal margin.

Generic diagnosis.—A genus of very large, dark species with pale antennae and legs, hyaline or faintly infuscated wings. They have the general habitus of the Neotropical *Scipopus* but are more elongate, with the thorax attenuated anteriorly as in *Rainieria;* the head more spherical; vertex horizontal; paracephalon convex and turgid. Frons broad with the ocelli in middle of the velvety black mesofrons, the latter not well defined cephalad but the opaque area extending from caudad of the postverticals to midway between ocelli and lunular margin, thence continuing as a fine line to lunular margin; the shining parafrons very broad, terminating cephalad in a sharp raised margin overhanging base of antennae (Fig. 27), and opposite the frontal bristle with a subconical swelling; inner verticals situated in advance of outer; postverticals and one posterior frontal, present. Antennae widely separated by the inflated, dorsoventrally convex, shining, setulose, mesofacies; arista micro-pubescent. Thorax very long, much longer than high; proscutum nearly twice as long as scutum; the narrow cephalic margin strongly humped in profile; one to two dorsocentrals; setae of sternopleural comb grouped tuft-like, not seriated. Claspers simple. Pterostigma nearly as long as third costal section; the latter about one-half as long as ultimate of vein IV; first posterior cell open; anal cell short, not attenuated.

All the known species of this genus are black except the antennae, pedicle of halteres, fore coxae, basal half of all femora, which are yellow; the first and second segments of fore tarsi and first of hind tarsi, white.

GENOTYPE: *Calobatina texana* Enderlein, 1922. (By monotypy and original designation).

Of the several described species associated by authors with the genotype, only two or three are here considered valid members. Whether these three are distinct, or represent only one or two species, I cannot satisfactorily decide, but for the present I am considering two, these having decided color characteristics.

Calobatina texana Enderlein (Pl. XIII, fig. 27.)

1878. *Calobata geometra* Osten Sacken in part, Cat. Dipt. N. Amer., (2), p. 179.
1922. *Calobatina texana* Enderlein, Arch. f. Naturg., LXXXVIII, A. p. 194.
1926. *Meganeria daeckei* Cresson, Trans. Amer. Ent. Soc., LII, p. 272.
1935. *Calobatina texana* Hennig, Stet. Ent. Zeit., XCVI, p. 37.

This species has the apical half of all femora dark, without any pale ring. There is some variation in the apparent color of the tarsi influenced more or less by the color of the pubescence, whether black or white, and also by some apical infuscation on the basal segments. Wings hyaline except for a slight clouding at extreme apices. Length: 11 to 12 mm.

Distribution.—This species was originally described on a male from Texas, collected by Boll, [type no. 7441, Mus. Univ. Berlin].

In the Museum of Comparative Zoology there is a female of this form labeled "*geometra*", "Dallas, Tex. Boll", "Osten Sacken Coll.", and is probably the source of Osten Sacken's record in his 1878 Catalogue of *geometra* from Texas. That Museum also has two males and a female topotype of *daeckei*, which was described on three males from Eberlys Mill, Cumberland Co., Pennsylvania, July 12, 1909, (E. Daecke), [A.N.S.P., type no. 6289].

This is the extent of the records of this species, totalling eight specimens.

Calobatina geometroides (Cresson)

1878. *Calobata geometra* Osten Sacken in part, Cat. Dipt. N. Amer., (2), p. 176.
1895. *Calobata varipes* Johnson (not Walker, 1853), Proc. Acad. Nat. Sci. Phila., 1895, p. 306 and 336.
1913. *Calobata varipes* Johnson, Bull. Amer. Mus. Nat. Hist., xxxii, p. 84.
1926. *Meganeria geometroides* Cresson, Trans. Amer. Ent. Soc., lii, p. 271. (New name.)
1935. *Calobatina geometroides* Hennig. Stet. Ent. Zeit., xcvi, p. 37.

This species differs from *texana* as here recognized, in having a distinct pale ring in the dark distal portion of the mid and hind femora. However, I find some variation in this character which suggests that this form may not be specifically distinct from *texana*. The female type of *varipes* Johnson has the dark distomedian femoral ring very narrow, less than the width of the pale ring; while on the other hand the male from Kentucky has the pale ring very faint, thus indicating an approach to obsoletion which would annul the distinction between this and *texana*.

This species has been questionably synonymized with *Neria geometra* Robineau-Desvoidy described from "Caroline", probably one of our Carolinas, but because of several discrepancies in the original description of that species I do not recognize such synonymy. Of *geometra*, (its bibliography I give below)[81] Osten Sacken (1882) says, "I also find them [the post vertical bristles] in the North American *Taeniaptera geometra* R. D.", from which statement one assumes that Osten Sacken was acquainted with that species, but I do not find any other reference to it by him except in his catalogue of 1878, as being a *Calobata* from Texas and Kentucky. If Osten Sacken is correct as regards the post-verticals, *geometra* cannot belong to the present genus. Robineau-Desvoidy gives the length as 11 lines (about 23 mm.) which is an extraordinary size even for a member of this genus, but is the only character that leads one to suspect its relation to the present species.

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[81] 1830. *Neria geometra* Robineau-Desvoidy, Myod., p. 736.
1858. *Neria geometra* Osten Sacken, Cat. Dipt. N. Amer., (1), p. 81.
1878. *Calobata geometra* Osten Sacken, Cat. Dipt. N. Amer., (2), p. 179.
1882. *Taeniaptera geometra* Osten Sacken, Berl. Ent. Zeit., xxvi, p. 195.
?1926. *Meganeria geometroides* Cresson, Trans. Amer. Ent. Soc., lii, p. 271.
?1935. *Calobatina geometra* Hennig, Stet. Ent. Zeit., xcvi, p. 37.

With *geometra*, Hennig (1935) synomymized three other of Robineau-Desvoidy's species, viz: *Neria atripes, N. carolinensis* and *N. longipes* (not Fab.), all stated as being from Carolina. I do not think any of these is synonymous with *geometroides*, but rather with *Calobata antennaepes* Say or *Taeniaptera trivittata* Macquart. On the other hand they may not be North American species. Their bibliographies as regards the North American literature I give below[32] for the use of other students who may want such information.

Distribution.—As of *texana*, very little can be said regarding the distribution of this species. It was originally described on the female sex from Jacksonville, Florida. It has also been recorded from Georgia by Hennig (1935), and is known to me from the following localities:

Specimens examined: 9.

TENNESSEE: McMinn Co.—Athens, VIII 22, (H. S. Barber), [U.S., 1].

TEXAS: Brazo County, [A.N.S.; M.C.Z., 2♂].

MISSISSIPPI: Lauderdale Co.—Meridian, VII 17, (R. H. Beamer), [Kans., 1♀].

GEORGIA: Charlton Co.—Billy's Island, Okefenokee Swamp, VI, (J. C. Bradley), [C.U. 1].

FLORIDA: Duval Co.—Jacksonville, V 22, (C. W. Johnson), [M.C.Z., ♀, type of *varipes*]. Walton Co.—DeFuniak Springs, V 24, (F. M. Jones), [M.C.Z., 1♂].

KENTUCKY: "Ky", "Osten Sacken Coll." [M.C.Z., 1♂].

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[32] 1830. *Neria carolinensis* Robineau-Desvoidy, Myod., p. 738, (1830): *Nerius carolinensis* Osten Sacken, Cat. Dipt. N. Amer., (1), p. 81, (1858), [citation only]: *Calobata ? carolinensis* Osten Sacken, Cat. Dipt. N. Amer., (2), p. 180, [cite. only].

The same references also apply to *atripes* and *longipes*, except the latter was described on page 737.

GRALLIPEZA Rondani

1850. *Grallipeza* Rondani, Nuov. Ann. Sci. Nat. Bologna, (3), II, p. 180.
1922. *Systellapa* Enderlein, Arch. f. Naturg., LXXXVIII, A, p. 189.
1934. *Grallipeza* Hennig, Stet. Ent. Zeit., XCV, p. 294.

Among the Taeniapterinae we recognize this genus by the band-like, not fusciform mesofrons, well developed postverticals, occiput convex but not tuberculous at vertex, clypeus and scutellum normal. Vein I is distinctly separated from subcosta at its tip (pterostigma well developed), and anal cell short.

I am following Hennig in using *Grallipeza* instead of *Systellapha* although I am not acquainted with *Calobata unimaculata* Macquart, 1846, the genotype of *Grallipeza*.

This is typically a Neotropical genus with but one, the following, species occurring within our limits.

Grallipeza nebulosa (Loew) (Pl. XIII, fig. 30.)

1866. *Calobata nebulosa* Loew, Berl. Ent. Zeit., X, p. 48. (Cent. VII, no. 89).
1895. *Calobata nebulosa* Johnson, Proc. Acad. Nat. Sci. Phila., 1895, p. 336.
1926. *Systellapha baracoa* Cresson, Trans. Amer. Ent. Soc., LI, p. 265. (New syn.) [Cuba.] [33]
1930. *Rainieria nebulosa* Cresson, Trans. Amer. Ent. Soc., LVI, p. 318.
1934. *Grallipeza nebulosa* Hennig, Stet. Ent. Zeit., XCV, p. 307.

Because of its micro-plumose arista, which, in poorly preserved specimens appears bare, I included this species in *Rainieria* instead of *Systellapha*, not at that time being well acquainted with those genera, placing too much emphasis on the aristal character.

This is no doubt the northern associate or representative of *placida* Loew, 1866, from which it is distinguished by the very short plumose arista and non-annulated femora.

Diagnosis.—General color buff yellow to translucent raw sienna. Black to brown are: the arista, ocellar tubercle, clypeus, abdomen (except venter and claspers) somewhat basally and apically, fore femur and tibia, and the three apical tarsal segments, distomedian ring on mid and hind femora, mid and hind tibiae basally and four apical segments of their

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[33] The synonymy of *baracoa* is based on futher study of additional material.

tarsi. White are: the halteres, two proximal segments of fore tarsi and proximal segments of mid and hind tarsi. Wings hyaline except a more or less developed central nebulous infuscation centering in base of first posterior cell. Fore femur sometimes pale basally and the femoral rings sometimes faint but usually discernable.

Vestiture very sparse; surfaces mostly shining with niveous reflections on the opaque mesofrons, face and bucca, and spots on the propleura and sternopleura; otherwise with faint cinereous reflections.

Length: 6 to 7 mm.

Distribution.—We may consider this a Neotropical species. Within our limits it occurs in the south Atlantic and Gulf coastal states; ranging southwards into the West Indies. It was originally described from Florida, on a male; type in the Loew Collection at Cambridge.

Specimens examined: 93.

LOUISIANA: Plaquemines Co.—Buras, VII 8-11, (J. S. Hine), [Ohio, 1♀].

GEORGIA: Glynn Co.—Saint Simons Island, IV 22, V 12, (J. C. Bradley), [C.U., 4].

FLORIDA: Square green label, [M.C.Z., ♂ type, no. 13328]. Gadsden Co. —Juniper "Creek", V 15, [M.C.Z., 1♀]. Columbia Co.—Suwanee Spring, VII 29, (R. H. Beamer), [Kans., 8♂, 2♀]. Saint Johns Co.—St. Augustine, [M.C.Z., 1♂]. Volusia Co.—Datona [Beach], IV 5-8, [M.C.Z., 1♂, 4♀]. Seminole Co.—Altamont [Springs], [M.C.Z., 1♀]: Sanford, (F. L. Eddy), [M.C.Z., 1♂]. Brevard Co.—Indian River [City], (Wittfels), [M.C.Z., 1♂]. Hillsborough Co.—Plant City, VIII 15, (Beamer, Tuthill, Nottingham, Oman), [Kans., 27♂, 17♀]. Charlotte Co.—Charlotte Harbor, [M.C.Z., 1♀]. Palm Beach Co.—"Fort" Worth, XII 19, (S. W. Bromley), [Bromley, 1♂, 1♀]: Lake Worth, IV 1, (Mrs. C. B. Cory), [M.C.Z., 3♀]. Dade Co.—Little Run, II, (F. Knab), [U.S., 1]: Miami, [M.C.Z., 1♂].

Fort Christmas, III 28, (McLeod; saw palmetto), [U.S.,5♀].

HOPLOCHEILOMA Cresson

1926. *Hoplocheiloma* Cresson, Trans. Amer. Ent. Soc., LII, p. 272.
1927. *Gymnosphen* Frey, Notulae Ent., VI, p. 71. (Syn. Hennig, 1935.)
1935. *Hoplocheiloma* Hennig, Stet. Ent. Zeit., XCVI, p. 54.

This genus is easily recognized by the presence of several short setae at the tip of the often conoid projecting clypeus (Fig. 28). In addition the postverticals are absent.

GENOTYPE: *Musca fasciata* Fabricius, 1775. (By original designation.)

Of the six species placed in the genus by Hennig, but one, the following comes within our range.

Hoplocheiloma fasciata (Fabricius) (Pl. XIII, figs. 28, 29.)

1775. *Musca fasciata* Fabricius, Syst. Ent., p. 781.
1805. *Calobata fasciata* Fabricius, Syst. Antl., p. 262.
1895. *Calobata fasciata* Johnson, Proc. Acad. Nat. Sci. Phila., 1895, p. 336. [List.]
1913. *Calobata fasciata* Johnson, Bull. Amer. Mus. Nat. Hist., XXXII, p. 84. [List.]
1922. *Tanypoda fasciata* Enderlein, Arch. f. Naturg., LXXXVIII, A, p. 202.
1926. *Hoplocheiloma fasciata* Cresson, Trans. Amer. Ent. Soc., LII, p. 272.
1936. *Hoplocheiloma fasciata* Hennig, Stet. Ent. Zeit., XCVI, p. 55.

A species easily recognized by the characters given of the genus. From its Neotropical allies we may distinguish it as follows:

General color ferruginous with darker abdomen; basal segment of fore tarsi and greater portion of the basal segment of mid and hind tarsi, white; mid and hind femora with dark disto-median and apical rings. Wings (Fig. 29) clear with definitely marked fuscous bands, a narrow one over base of discal cell and a broad one over the apex of the cell and including the posterior crossvein, and an apical one over distal half of ultimate section of vein IV and which generally contains an isolated clear spot.

Length: 6.5 to 7.2 mm.

Distribution.—This is typicaly a Neotropical species, originally described from "Americae" and again recorded by its author (1805) from "America Insulis". It is apparently confined to the West Indies and the southern portion of Florida.

It has been recorded from Lake Worth, Bicayne Bay and Everglade, by Johnson (1895 and 1913), and from Miami by Hennig (1934). I have seen it from the following localities:

Specimens examined: 21.

FLORIDA: "Fla", (Maynard), [U.S., 2]. Palm Beach Co.—Lake Worth, XII 14, (S. W. Bromley), [Bromley, 12♂, 4♀]. Dade Co.—Biscayne Bay, (A. T. Slosson), [U.S., 1♀, det. Coquillett]: Brockell's Hammock, Miami, II, III, (M. Hebard), [A.N.S., 2♂]: Royal Palm State Park, III 9, (F. M. Jones), [Jones, 2♂]: IV 22, (A. L. Melander), [Mel., 1♂, 1♀]. Collier Co.—Everglades, IV, (F. M. Jones; in sugar trap), [Ohio, 1♂]. Monroe Co.—Paradise Key, VI 30, (G. Fairchild). [M.C.Z., 1♂].

TAENIAPTERA Macquart

1835. *Taeniaptera* Macquart, Hist. Nat. Ins., Dipt., II, p. 491.
1922. *Grallopoda* Enderlein, Archiv. f. Naturg., LXXXVIII, A, p. 212, (not ? Rondani, 1850).
1930. *Taeniaptera* Cresson, Trans. Amer. Ent. Soc., LVI, p. 349.

As regards the species of this genus occurring within our limits, we may consider only the long attenuated anal cell, the elongate third antennal segment and the lunate subapical band in the generally uniformally infuscated wing.

Synonymy.—The name *Taeniaptera* is, in my opinion, perfectly valid here and need not be confused with *Taenioptera* Bonapart, 1825, in Aves. Especially is it more satisfactory than *Grallopoda*, the genotype of which may be questioned. *Grallopoda* Rondani [34] has been used by some authors for this genus, but Rondani cites *Calobata albimana* Macq.[35] a questionable species, as the genotype, consequently, until the status of *albimana* is established [36] *Grallopoda* is untenable. I am not considering the synonymy of *Grallomyia* Rondani, 1850, cited as such by some authors as the species of that genus do not come within the limits of the present paper.

The present genus originally contained only *Taeniaptera trivittata* Macq., characterized as having the first posterior cell closed. It now contains, in addition, several Neotropical species.

Generic diagnosis.—Head free, subglobose, higher than long, with eyes vertical; frons not restricted medianly, rather narrow, with parallel orbits; mesofrons flat, narrow to linear except above, and except for the small generally rounded velvety-black spot not markedly different from the anteriorly rugose parafrons; vertex generally somewhat carinate, with postverticals generally present; third antennal segment distinctly longer than broad; arista bare; palpi broad, subfalcate. Thorax distinctly attenuated anteriorly, typically longer than high; cervical [37] relatively conspicuous; humeral callus longitudinally subcarinate, not tuberculose; mesonotum with one to two dorsocentrals; scutellum short, at most pubescent, not pilose.

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[34] Nov. Ann. Sci. Nat. Bologna, (3), II, p. 178, (1850).

[35] Dipt. Exot. Suppl., IV, p. 363, (1850).

[36] See under *trivittata*.

[37] Small rounded sclerite or callus at base of foramen laterally.

The wing pattern (Fig. 32 our species) consists, of a broad infuscated discal area with distal margin convex beyond posterior crossvein and its proximal margin rather straight or convex and not attaining the anterior crossvein; a narrow subbasal band proximad of the anterior crossvein; the infuscated apical area with a concaved proximal margin, forming with the discal infuscation a lunate hyaline band just distad of the tip of second vein, which band, however, may be absent or but slightly lunate.

Taeniaptera lasciva (Fabricius)

1798. *Musca lasciva* Fabricius, Ent. Syst. Suppl., p. 564.
1805. *Calobata lasciva* Fabricius, Syst. Antl., p. 262. (Gen. change.)
1913. *Calobata lasciva* Johnson, in part, Bull. Amer. Mus. Nat. Hist., XXXII, p. 84. [List.]
1922. *Grallopoda lasciva* Enderlein, Arch. f. Naturg., LXXXVIII, A, p. 212.
1930. *Taeniaptera lasciva* Cresson, Trans. Amer. Ent. Soc., LVI, p. 350.
1934. *Taeniaptera lasciva* Hennig, Stet. Ent. Zeit., XCV, p. 86, pl. 1, fig. 21; pl. 3, fig. 21.

Calobata albimana Macquart, 1843, has been treated as a synonym of this species by Schiner[38] but this name was based on material from several different faunal regions and is further treated in the present paper under *trivittata.*

Diagnosis.—A dark species with the head rather ferruginous; vertex flattened, micro-rugulose and cinereous; postverticals present; the claspers simple. Fore legs dark with basal segment of their white tarsi black; mid legs black, their femora with pale distomedian ring; hind legs similar but their femora have also a pale basal ring. Fore tarsi with conspicuous black flexor setulae, particularly at margin; their basal segment more or less black basally. Subapical hyaline band of wings narrow and strongly lunate; first posterior cell closed.

Although the mid and hind femora are normally dark, with pale rings they are sometimes so diluted that the darkening is noticeable only distally and such individuals may be mistaken for *trivittata.* The width of the distal hyaline wing band is also subject to variation; also the apex of the fore tarsi may be brownish.

Distribution.—This is typically a Neotropical species, originally described from French Guiana, but has been recorded occurring as far north as New York.[39] These northern records, however, probably refer to *trivittata* and are so treated in this paper. As far as known to the writer, this species comes within our limits only in southern Florida and in the south costal region of Texas. In these areas *trivittata* also occurs. All of Johnson's records of 1895[40] from the northern section of Florida, I am referring to *trivittata*; also those from such northern localities in his later list (1913); but I cannot place those from Lake Worth, Biscayne Bay and Fort Myers. Hennig, 1934, records the species from Miami, and the writer (1930) has recorded it from Texas and also from Florida. These latter will be included in the following list:

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[38] Reise Novara, Zool., II, p. 253, (1868).

[39] Osten Sacken, Cat. No. Amer. Dipt., (2), p. 179, (1878).

Specimens examined: 16.

TEXAS: Cameron county, VIII 3, (R. H. Beamer), [Kans., 1♂]: Brownsville, V 17, [Ohio, 1♀]; VI 11-16, [M.C.Z., 1♂, 1♀]; XI 20, [Ill., 4]: Harlingen, VII 28, VIII 4, (R. H. Painter), [Painter, 4].

FLORIDA: Dade Co.—Homestead, VIII 9, (R. H. Beamer), [Kans., 1♂, 1♀]: Larkins, I 13, (H. L. Viereck), [Can., 1]. Broward Co.—Fort Lauderdale, VIII 28, (D. M. Bates), [M.CZ., 1♀].

Taeniaptera trivittata Macquart (Pl. XIII, figs. 31, 32.)

1835. *Taeniaptera trivittata* Macquart, Hist. Nat. Ins. Dipt., II, p. 491, pl. 20, fig. 9.
1843. *Calobata albimana* Macquart (in part), Dipt. Exot., II, p. (3), p. 245.
1853. *Calobata valida* Walker, Ins. Saund., I, p. 390.
1878. *Calobata lasciva* Osten Sacken (in part) (not Fabricius), Cat. Dipt. No. Amer., (2), p. 179 and 256.
1890. *Calobata lasciva* Johnson (not Fabricius), Smith's Ins. N. Jersey, (1), p. 397. [List.]
1895. *Calobata lasciva* Johnson (not Fabricius), Proc. Acad. Nat. Sci. Phila., 1895, p. 336. [List.]
1900. *Calobata lasciva* Johnson (not Fabricius), Smith's Ins. N. Jersey, (2), p. 692. [List.]
1910. *Calobata lasciva* Johnson (not Fabricius), Smith's Ins. N. Jersey, (3), p. 803. [List.]
1913. *Calobata lasciva* Johnson (in part) (not Fabricius), Bull. Amer. Mus. Nat. Hist., XXXII, p. 84. [List.]
1914. *Taeniaptera divaricata* Cresson, Ent. News, XXV, p. 459.
1920. *Taeniaptera divaricata* Britton, Bull. Conn. Geol. Nat. Hist. Surv., no. 39, p. 204. [List.]
1922. *Grallopoda divaricata* Enderlein, Arch. f. Naturg., LXXXVIII, A. p. 212.

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[40] Proc. Acad. Nat. Sci. Phila., 1895, p. 336, (1895).

1925. *Taeniaptera divaricata* Johnson, Occ. Pap. Boston Soc. Nat. Hist., vii, p. 265. [List.]

1926. *Taeniaptera divaricata* Leonard, Mem. Cornell Univ., 101, p. 853. [List.]

1934. *Taeniaptera trivittata* Hennig, Stet. Ent. Zeit., xcv, p. 86.

This species is based on a very meager description and a poor figure. That description may be roughly translated: Head and thorax black; femora tawny with a brown ring at middle; wings with three brown bands; the immediate one large and somewhat round; first posterior cell closed. This, applying to a North American species is seen to agree well with what I had described as *divaricata*. It cannot apply to *Calobata antennaepes* Say.

The species is apparently the Nearctic representative of the Neotropical *lasciva*, differing from it in the more shining frons, paler femora and the claspers having a basal prong.

Synonymy.—The above extensive bibliography is occasioned by the fact that all early citations of this species have been *lasciva*, and it was not until 1914, when as *divaricata* it was recognized as a distinct species.

Calobata albimana Macquart was originally based on material from Java, Cuba,[41] and Philadelphia and was evidently a composite species. The Philadelphia series no doubt is referable to *trivittata*, and as such has been suggested by Osten Sacken (1878) and followed by Hennig (1934).

Calobata valida was treated as a synonym of *lasciva* by Osten Sacken (1878), but of *trivittata* by Hennig (1934). It was originally described from the " United States " and from the following features in Walker's description, I consider the latter synonymy correct: " Head ferruginous . . . crown bluish black, shining, frontalia ferruginous . . . ; third joint of the feelers pitchy above . . . ; hind chest and breast blue, the latter ferruginout in front . . . ; fore feet (tarsi) white, black toward base; wings pale brown, colourless at base, with two whitish bands, one a little before the middle, the other near the tip."

Although typically the color of the legs may be a distinguishing character in separating this species from *lasciva*, the mid and hind femora of that species often are as pale as they are in the present one. The following features seem to be less subject to variations.

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[41] The series from Cuba is possibly *lasciva*. Enderlein (1922) recognized a form he names *albimana* Macquart, as a variety of *lasciva*, and is probably merely a variety of that species with paler legs.

Diagnosis.—Clypeus as long as distance between antennae; vertex more convex, not flattened or sharply defined caudad (although a few individuals will show a slight flattening), shining to polished sometimes slightly granulose with slight pollinosity; claspers (Fig. 31) with four prongs (two of them short, basal); fore coxae and femora pale; mid and hind femora generally pale with paler disto-median ring, sometimes darkened apically; fore tarsi without black flexor setulae, basal segment entirely white to base.

Distribution. — This species is typically Nearctic, originally described from "Amerique septentrionale" and is confined to the eastern part of the United States ranging southwards to southern Florida and Texas where it is found with *lasciva.* I know of no authentic records from the West Indies. Its early confusion with *lasciva* allows us to assume that all records of that species from north of Florida should be referred to the present one. Consequently I am crediting all the following records of *lasciva,* to *trivittata*: Osten Sacken (1878) from New York, Johnson (1890, 1900, 1910) from New Jersey and those of Johnson (1900 and 1913) from northern Florida.

As *divaricata* Cresson it was described from Billy's Island, Georgia and under that name we have published records from Connecticut by Britton (1920) and Johnson (1925); from Brooklyn, Long Island, New York by Leonard (1926). Hennig (1934) gives additional records from New York. I have seen the following material:

Specimens examined: 88.

NEW YORK: "N.Y. 422", "Osten Sacken Coll.", "422 *Calobata albimana* Mcq.?", [M.C.Z., 1♀]. No data except VIII 26, (H. Bird; in borings), [Bird, 1♀].

NEW JERSEY: Cape May Co.—Anglesea, VI 20, (F. Haimbach), [A.N.S., 2♂, 2♀].

PENNSYLVANIA: Philadelphia, VII 15, (E. G. Vanatta), [A.N.S., 1♂].

MARYLAND: Calvert Co.—Chesapeak Beach, VI 18, (Jackson), [Biol., 2♂, 1♀].

NORTH CAROLINA: Moore Co.—Southern Pines, VIII 10, (A. H. Manee), [Ohio, 1♂].

TEXAS: Travis Co.—Austin, VI 26, (R. H. Painter), [Painter, 1]. Comal Co.—New Braunfels, VIII 10, (Nabours & Sabrosky), [Sab., 1♀]: IX 27, (Pratt), [U.S., 1]. Orange county, VIII 14, (L. D. Beamer), [Kans., 1♂].

LOUISIANA: East Baton Rouge, VI 22, (Pratt), [U.S., 6]. Acadia Co.—Crowley, VII 19, (J. S. Hine), [Ohio, 2♀]: X 14, (Tucker), [U.S., 1♀]. Calcasieu county, VIII 16, (R. H. Beamer), [Kans., 2♂]. Cameron Co.—Cameron, VII 23-30, (J. S. Hine), [Ohio, 2♂].

ALABAMA: Dallas Co.—Marion Junction, VII 16, (R. H. Beamer), [Kans., 1♂]. Autauga Co.—Prattsville, VII 21, (R. H. Beamer), [Kans., 2♀]. Clark Co.—Jackson, VI 11, (J. Bequaert), [Bequaert, 1♂]. Washington Co.—Leroy, VI 11 (J. Bequaert), [Beq., 2♀].

GEORGIA: Bibb Co.—Macon, VII 25, (R. H. Beamer), [Kans., 1♀]. Fulton Co.—Silver Lake, VIII 10, [C.U., 1♂, 1♀]. Chatham Co.—Savannah, (F.H.B., 1925; bred from easter lilies from Japan),[42] [U.S., 1♂, 2♀]. Decatur Co.—Spring Creek, VII 16, (J. C. Bradley), [C.U., 1♀]. Charlton Co.—Billy's Island, Okefenokee Swamp, VI, [C.U., 5♂, 7♀; type and paratypes of *divaricata* Cresson].

FLORIDA: "Fla", [Ill., 1]. "S. Fla", III, (J. S. Hine), [Ohio, 3♂, 3♀]. Columbia Co.—Suwanee Springs, VII 29, (Beamer, Tuthill, Oman), [Kans., 2♂, 4♀]. Ponelas Co.—Dunedin, I, II, (W. S. Blatchley), [Mel., 2♀]. Hillsborough Co.—Plant City, VIII 15, (R. H. Beamer), [Kans., 8♂, 12♀]. Polk Co.—Lakeland, II 15, (W. S. Blatchley), [Mel., 1♂]. Manatee Co.—Bradentown, IV 14, (C. O. Bare), [Kans., 1♂]. Lee Co.—Fort Myers, V 9, (J. C. Bradley), [C.U., 1♂]. Palm Beach Co.—Boynton, XII 17, (S. W. Bromley), [Bromley, 1♂].

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[42] There is probably a mistake in this record.

EXPLANATION OF PLATES

PLATE XI

Fig. 1.—*Micropeza abnormis* Cresson. ♂. Ventral aspect of genitalia. × 20.

Fig. 2.—*Micropeza turcana* Townsend. ♂. × 10.

Fig. 3.—*Micropeza turcana* Townsend. Dorsal aspect of head, showing color pattern. × 20.

Fig. 4.—*Micropeza turcana* Townsend. Dorsal aspect of thorax, showing color pattern. × 20.

Fig. 5.—*Micropeza setaventris* Cresson. Lateral aspect of head, showing color pattern. × 20.

Fig. 6.—*Micropeza setaventris* Cresson. ♀. Ventral aspect of abdomen, showing setation of sternites. × 20.

Fig. 7.—*Micropeza lineata* Van Duzee. ♂. Lateral aspect. × 10.

Fig. 8.—*Micropeza lineata* Van Duzee. Dorsal aspect of head, showing color pattern. × 20.

Fig. 9.—*Micropeza nitidor* Cresson. ♂. Lateral aspect of head, showing color pattern. × 20.

Fig. 10.—*Micropeza nitidor* Cresson. ♂. Lateral aspect of apex of abdomen, showing claspers. × 20.

Fig. 11.—*Neriocephalus stigmatica* (van der Wulp). Dorsal aspect of thorax, showing color pattern. × 20.[43]

Fig. 12.—*Neriocephalus stigmatica* (van der Wulp). ♂. Lateral aspect of part of abdomen, showing claspers. × 20.

Fig. 13.—*Neriocephalus ruficeps* (van der Wulp) ♂. Lateral aspect of part of abdomen, showing claspers. × 20.

Fig. 14.—*Neriocephalus ruficeps* (van der Wulp). ♂. Ventral aspect of postabdomen, showing styli. × 20.

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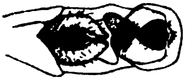
[43] This figure should have been reversed, right to left.

PLATE XII

Fig. 15.—*Paracalobata univitta* (Walker). ♂. Lateral aspect of apex of abdomen, showing claspers. × 20.
Fig. 16.—*Paracalobata univitta* (Walker). ♂. Ventral aspect of abdomen, showing claspers. × 20.
Fig. 17.—*Paracalobata pallipes* (Say). ♀. Oblique-lateral aspect of ovipositor segment. × 20.
Fig. 18.—*Paracalobata mima* (Hennig). ♂. Lateral aspect of abdomen, showing claspers. × 20.
Fig. 19.—*Paracalobata mima* (Hennig). ♂. Ventral aspect of claspers. × 20.
Fig. 20.—*Paracalobata mima* (Hennig). ♀. Oblique-lateral aspect of ovipositor segment. × 20.
Fig. 21.—*Paracalobata kennicotti* (Banks). ♂. Lateral aspect of claspers. × 20.
Fig. 22.—*Cnodacophora nasoni* (Cresson). ♂. Lateral aspect of abdomen. × 20.

PLATE XIII

Fig. 23.—*Rainieria antennaepes* (Say). Dorsal aspect of head. × 20.
Fig. 24.—*Rainieria antennaepes* (Say). Lateral aspect of head. × 20.
Fig. 25.—*Rainieria antennaepes* (Say). ♂. Ventral aspect of claspers. × 20.
Fig. 26.—*Rainieria antennaepes* (Say). Wing. × 10.
Fig. 27.—*Calobatina texana* Enderlein. Lateral aspect of head. × 20.
Fig. 28.—*Hoplocheiloma fasciata* (Fabricius). Cephalo-lateral aspect of head. × 20.
Fig. 29.—*Hoplocheiloma fasciata* (Fabricius). Wing. × 10.
Fig. 30.—*Grallipeza nebulosa* (Loew). Cephalo-lateral aspect of head. × 20.
Fig. 31.—*Taeniaptera trivittata* Macquart. ♂. Lateral aspect of part of abdomen, showing genitalic assemblage. × 20.
Fig. 32.—*Taeniaptera trivittata* Macquart. Wing. × 10.



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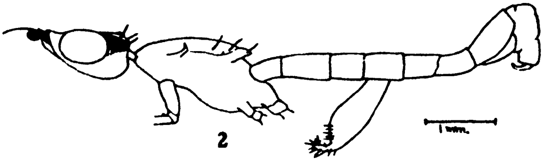

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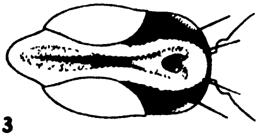

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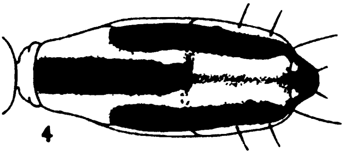

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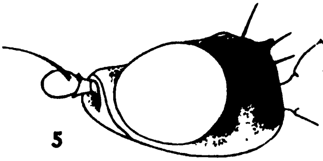

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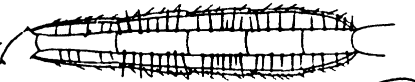

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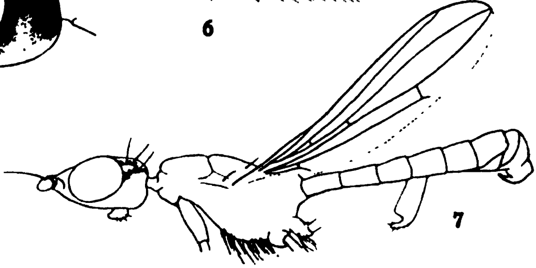

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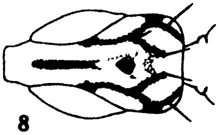

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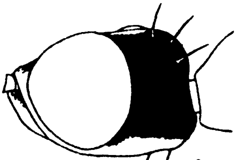

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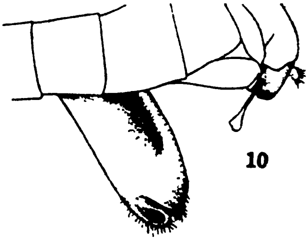

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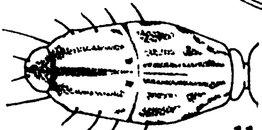

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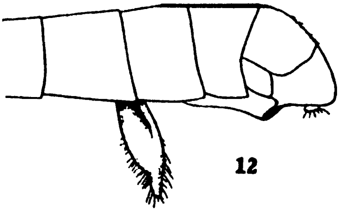

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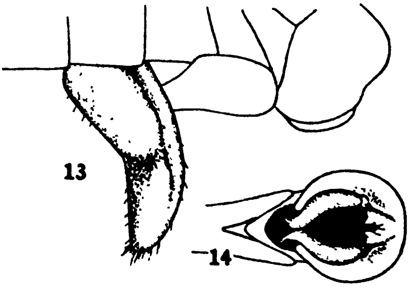

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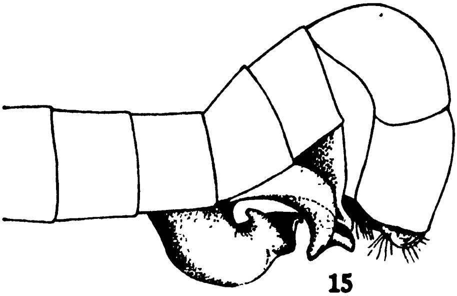
CRESSON—AMERICAN NERIIDAE AND MICROPEZIDAE



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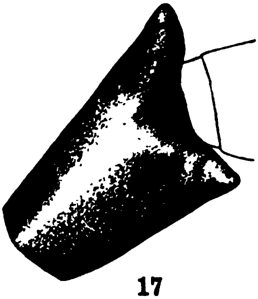

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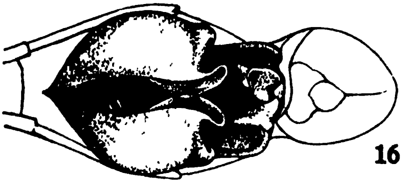

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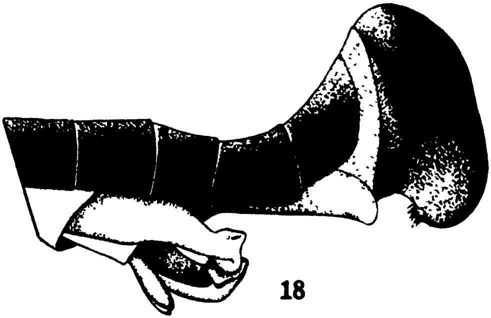

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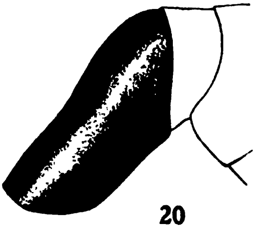

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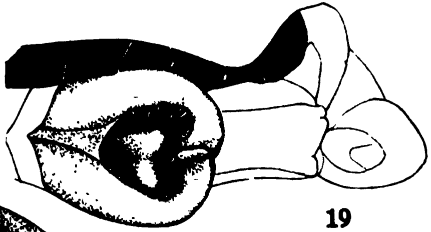

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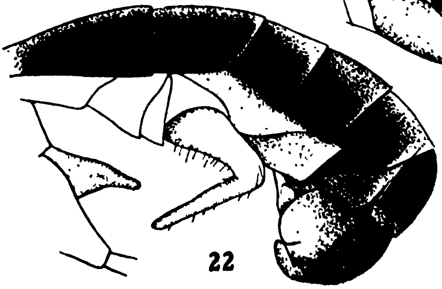

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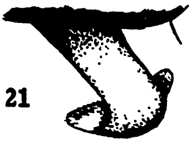

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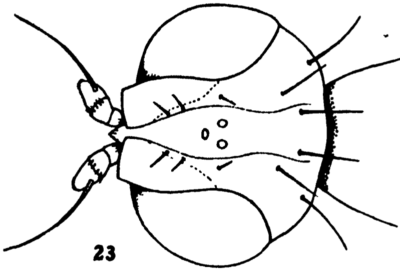
CRESSON—AMERICAN NERIIDAE AND MICROPEZIDAE



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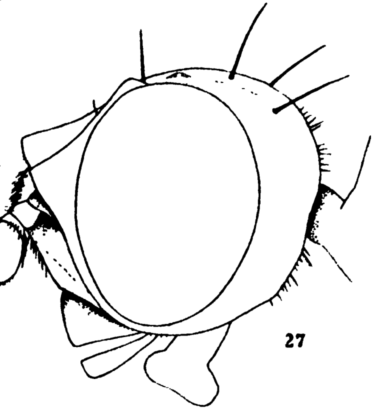

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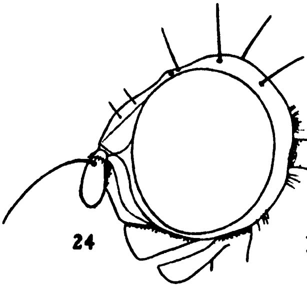

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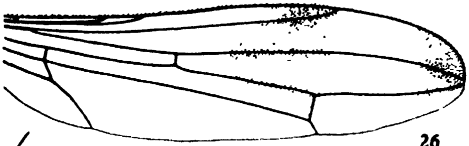

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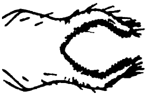

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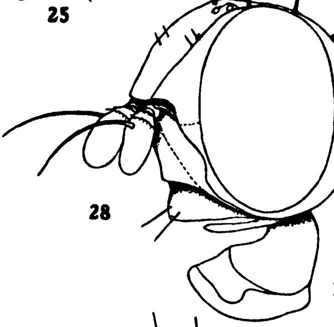

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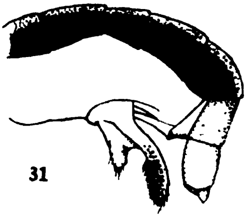

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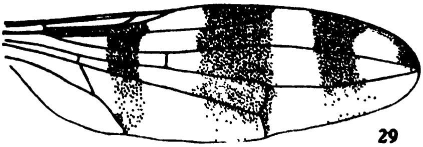

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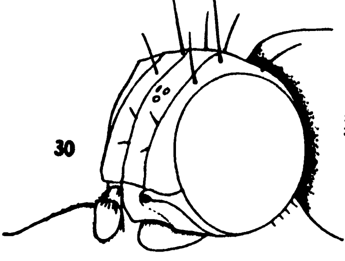

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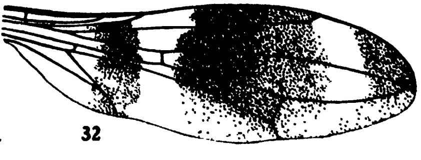

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CRESSON—AMERICAN NERIIDAE AND MICROPEZIDAE

NOTES ON THE GENUS HAANIELLA WITH THE DESCRIPTION OF A NEW SPECIES

(ORTHOPTERA: PHASMATIDAE)

BY JOHN W. H. REHN

(Plate XIV)

While engaged in the determination of various Oriental walking-stick insects a number of interesting facts have been gathered together. This is particularly true in the genus *Haaniella* which has at times been confused with *Heteropteryx*. It has been deemed advisable at this time to point out certain new synonymy as well as to describe a new form.

HAANIELLA Kirby

1904. *Haaniella* Kirby, Ann. Soc. Nat. Hist., (7), XIII, p. 444.
1906. *Heteropteryx* Redtenbacher, Insektenfam. Phasm., I, p. 168.
1910. *Haaniella* Kirby, Syn. Cat. Orth., I, p. 397.
1923. *Haaniella* Karny, Treubia, III, p. 234.

GENOTYPE (by monotypy): *Phasma* (*Heteropteryx*) *mülleri* Haan [= *Haaniella mülleri* (Haan)].

As has been pointed out by Dohrn[1] in his critique of Die Insektenfamilie der Phasmiden, Redtenbacher has confused *Heteropteryx* of Gray[2] with *Heteropteryx* of Haan.[3] It was originally pointed out by Kirby that *Heteropteryx* of Gray and of Haan were not the same and at that time he proposed the name *Haaniella*. While this was overlooked by Redtenbacher it has subsequently been confirmed by both Dohrn and Karny.

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[1] Entomologische Zeitung, Stettin, LXXI, pp. 401, 402, (1910).

[2] Syn. Phasm., pp. 13, 32, (1835).

[3] Bijdragen Kennis Orth., in Verhandl. Natuurl. Geschied., p. 108, (1842).

Moreover, it has also been pointed out that *Leocrates* of Stål[4] is an absolute synonym of *Heteropteryx* Gray, the genotype of *Heteropteryx* being *Phasma dilatatum* Parkinson, while that of *Leocrates* is *Cyphocrania graciosa* Westwood [=*Heteropteryx dilatatum* (Parkinson)].

Haaniella graylii (Westwood)

1859. *Heteropteryx Grayii* Westwood, Cat. Orth. Ins. Brit. Mus., I, Phasmidae, p. 82, pl. 30, figs. 2 and 3. [♂, ♀; Borneo.]
1904. *Haaniella Grayii* Kirby, Syn. Cat. Orth., I, p. 397.
1906. *Heteropteryx grayi* Redtenbacher, Insektenfam. Phasm., I, p. 170.

BORNEO: one male; [Hebard Collection].

This specimen agrees in all respects with both the original description and the figure.

Haaniella echinata (Redtenbacher)

1906. *Heteropteryx echinata* Redtenbacher, Insektenfam. Phasm., I, pp. 168, 171, pl. 6, figs. 10 and 11. [♂, ♀; Borneo.]
1906. *Heteropteryx saussurei* Redtenbacher, Insektenfam. Phasm., I, pp. 168, 171. [♀; Sunda Islands, Borneo.]

LABUAN: one male; three females; [Hebard Collection].

BORNEO: one male; [Museum of Comparative Zoology]. Sandakan; (C. F. Baker); one immature male; [Hebard Collection].

With additional material of *echinata* before us it immediately becomes evident that the specimen described by Redthenbacher as *saussurei* represents only a recessively spined form of *echinata*. The female of *echinata* described by Redtenbacher was undoubtedly damaged, as shown by both his description and figure. Apparently the apices of the ultimate tergite and of the operculum have been broken off. This is the main character dwelt upon in his description.

The dimensions of the specimens before us are practically intermediate between those given by Redtenbacher for *echinata* and *saussurei*, as the following measurements (in millimeters) of Labuan material show:

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[4] Rec. Orth., III, p. 48, footnote.

	Length of body	Length of pronotum	Length of mesonotum	Length of tegmen	Length of anterior femur	Length of median femur	Length of posterior femur
♂. Labuan ...	85.	9.	12.	16.5	21.8	18.	27.3
♀. Labuan ...	108.	10.5	14.	24.	22.	18.5	28.
♀. Labuan ...	122.	13.	17.	25.	25.	22.5	32.

All of the individuals before us show some variation in the strength of their spination. It is therefore evident that *echinata* shows considerable variation in the size of spines and in the degree of spination.

In the immature male which appears to be in the instar preceding maturity, there are two well developed spines placed between the wing bases, which in the mature individuals have been reduced to little more than small knobs. It seems quite possible that this may happen in the development of other species of this genus, as in the males of *grayii* and *echidna* there are small knobs in this position.

Haaniella scabra (Redtenbacher)

1906. *Heteropteryx scabra* Redtenbacher, Insektenfam. Phasm., I, p. 168, 171. [♂, ♀; Kina Balu, Borneo.]

NORTH BORNEO: (Waterstradt); one male; [Hebard Collection].

LABUAN: one male; two females; [Hebard Collection].

The male specimens agree absolutely with all the features of the original description, but the females are somewhat longer than the sole measurement given by Redtenbacher. It is quite possible, however, that the specimen he measured may have had the abdomen retracted, as in the other dimensions the females before us agree very well with the measurements given by Redtenbacher.

Haaniella echidna new species (Pl. XIV, fig. 1.)

This distinctive species apparently shares features of *H. grayii* and *H. echinata*, combining with the general body form of the former, spinational features more like those of *echinata*. From both it can be distinguished by the more decided longitudinal carinate rugae of the mesonotum, the tegminal pattern and the character and disposition of the spination of the dorsum of the abdomen. From *grayii* it may be differentiated by the somewhat narrower metathoracic and posterior mesothoracic regions, and the absence of pronounced paired spines mesad on the mesonotum. From *echinata* it is also separable by the more slender thoracic segments in their entirety, which is quite pronounced in the case of the mesonotum, the more elongate limbs (in this as in *grayii*) and the subequal width of the abdominal tergites two to six (similarly more as is *grayii*). Many other minor details given below show differences from the conditions found in the other species mentioned.

Type.—♂; Sadong, Sarawak, Borneo. (H. W. Smith). [Hebard Collection, Type no. 1294].

General size relatively large and quite elongate for the genus; general surface quite rough, armed with numerous spines and spinose tubercles as well as having the entire surface more or less granulate.

Head with crest of spines, four large spines posterior, two mesad and four smaller ones anterior, the four median ones largest; three small spines on a line with posterior portion of eyes. Eyes large, very prominent, ocelli absent. Antennae with two basal articles thickened, third as long as four and fifth together.

Pronotum twice as long as wide, lateral margins spined, both anterior and posterior spines large with three or four smaller spines between; four pairs of spines along mid dorsal line, the second pair being very large, others small. Pleura with one or two small spines, ventro-lateral margins with a row of small spines enlarging posteriorly.

Mesonotum with lateral margins armed with six to eight irregularly spaced spines; definite median line from anterior fourth; two pronounced carinae converging posteriorly, with two large spines slightly mesad of them; posterior margin with four large median spines; whole surface slightly tuberculate. Pleural margins armed with seven or eight spines, one at posterior fourth larger, large spine latero-mesad. Coxal margin with two or three spines, small spines basad.

Metanotum with two small tubercles between wing bases; lateral margins of pleura with a row of spines, median three larger, large heavy spine mesad on pleura; metasternum with row of four spines on anterior third, and another row of heavier spines at posterior third, with a pair of small spines between these rows, and another pair posterior of latter row; latero-coxal margin with one spine.

Abdomen with sides parallel to seventh segment then gradually widening to middle of eighth and then gradually narrowing; tergites two to seven with lateral margins spined, those on seventh shorter; row of paired spines mesad on tergum, starting at posterior margin of second and continuing to posterior margin of seventh, three or four pairs of spines on each segment, occasionally only one spine; anterior and posterior margins of these segments with a row of small spines; second to seventh sternites with rows of four spines at anterior and posterior third; tenth tergum faintly bilobate, small lateral lobes; eleventh tergum small, node-like: operculum short, emarginate, cerci short, club-like.

Tegmina short, elliptical, about two and one-half times as long as broad, subcosta very pronounced. Wings with all the venation very prominent.

Limbs elongate; coxae with one large and several small spines on anterior margin; all femoral margins spined. Ventro-internal margin of anterior femora near apex with two heavy spines, tibia with faint spines on flexor margin, extensor tuberculate. Median limbs as anterior ones. Posterior tibia with large heavy spines on flexor margin, those near apex larger and heavier; extensor margins with small spines.

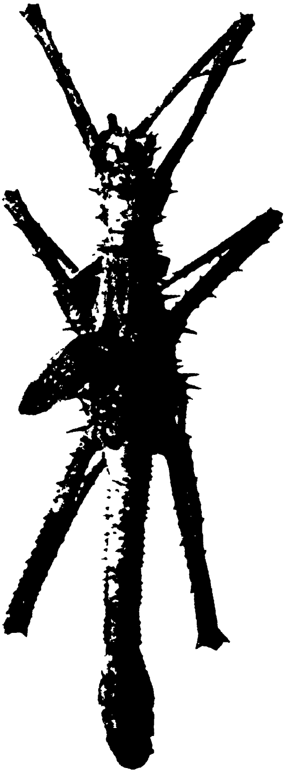
General color carob brown with limbs varying to chestnut brown; veins of tegmina black, veins of wings from tawny to black; spines sometimes tipped with black, ventral surface russet; eyes cinnamon brown, antennae kaiser brown with apex of articles almost black. Median segment pale tawny.

Length of body 83.5 mm.; length of pronotum 9.5; length of mesonotum 13.5; length of metanotum 4.5; length of median segment 5; length of anterior femur 23; length of median femur 19; length of posterior femur 27.

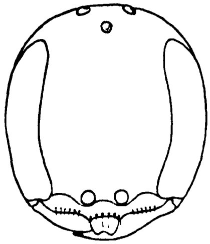
In addition to the holotype we have examined one additional male which has exactly the same data and agrees in all essential respects with the type. This specimen which we are considering a paratype belongs to the Museum of Comparative Zoology.

EXPLANATION OF PLATE XIV

Haaniella echidna new species, type ♂.



REHN—THE GENUS HAANIELLA



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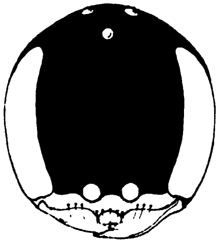

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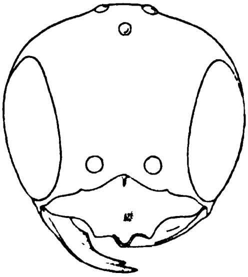

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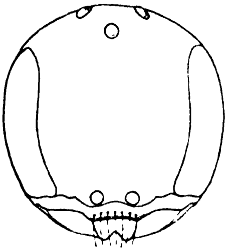

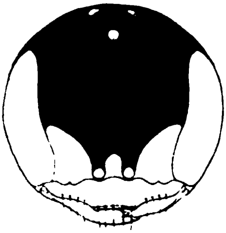

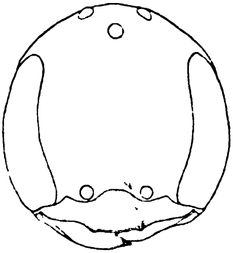

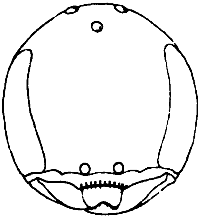

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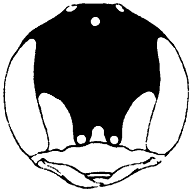

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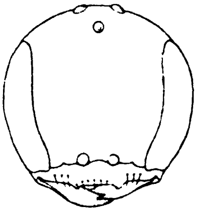

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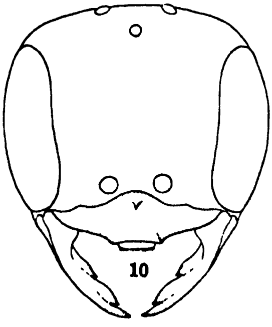

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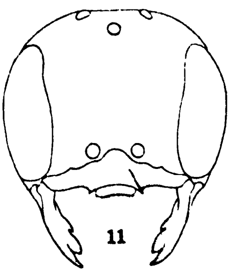

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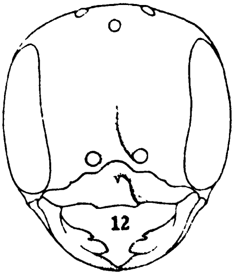

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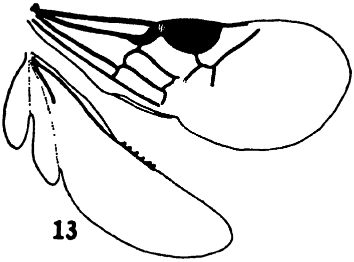
PATE—PEMPHREDONINE WASPS



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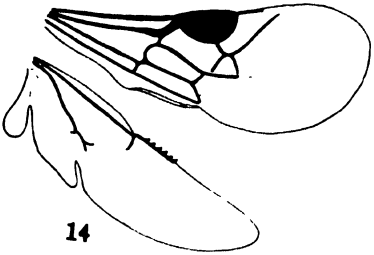

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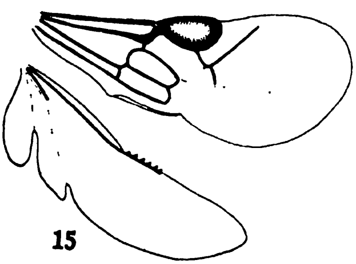

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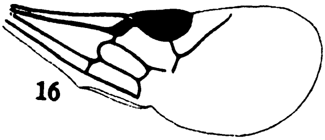

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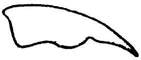

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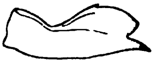

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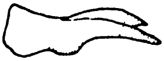

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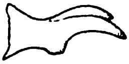

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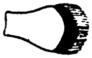

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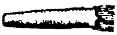

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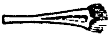

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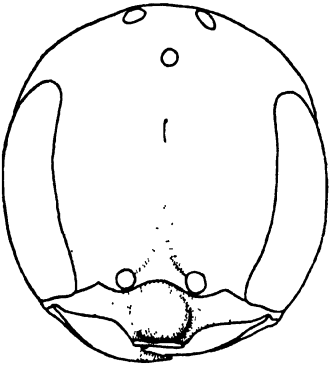

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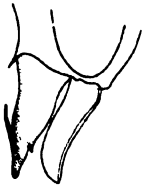

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PATE—PEMPHREDONINE WASPS

STUDIES IN THE PEMPHREDONINE WASPS

(HYMENOPTERA: SPHECIDAE)

II.[1] Records and Descriptions of New Forms in the Ammoplanoid Complex from the Southwestern United States

BY V. S. L. PATE

(Plates XV and XVI)

Over a year ago the first part of this series representing a discussion of the Ammoplanoid complex with particular reference to the Nearctic forms appeared.[1] Since the publication of that paper I have had an opportunity to study considerable additional material of the group and am now in a position to amplify and modify certain views expressed there. The data now at hand indicate that the biocentre in the Nearctic region of these forms, which are primarily vernal, is in all probability in the southwestern United States.

The present paper is based primarily upon a large collection of Ammoplanoids sent to me by Dr. P. H. Timberlake of Riverside, California, to whom I wish to express my thanks for his kindness and cordial help in conveying to me this interesting material for study. The collection is mainly from the Mohave and Colorado Desert regions of southern California and is of particular interest in that it contains a new and remarkable genus of minute wasps which is separable into three distinctive subgenera and five discrete new forms. This anomalous genus *Timberlakena* represents one of the most highly specialized entities of the Sphecoids as yet known. In addition, the collection contains many new species of the genera *Ammoplanops* and *Ammoplanus*,[2] as well as numerous additional specimens described or reported in my previous paper.

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[1] Pt. I. Trans. Amer. Ent. Soc., LXIII, pp. 89-125, (1937).

[2] These will be treated in a revision of the Nearctic species of *Ammoplanus* to appear as the third paper of this general series.

A new form and additional specimens[3] taken in 1902 by the late Henry Lorenz Viereck and James A. G. Rehn in southern New Mexico, as well as the material of this group collected in Texas, New Mexico and Arizona on the Southwest Orthoptera Survey of 1937[4] of the Academy of Natural Sciences of Philadelphia is reported or described on the ensuing pages.

Acknowledgments.—It gives me pleasure to acknowledge the assistance tendered me by Mr. Nathan Banks, Curator of Insects at the Museum of Comparative Zoölogy, Dr. E. A. Chapin, Curator of Insects at the National Museum and Miss Grace A. Sandhouse of the Bureau of Entomology and Plant Quarantine, and Mr. George R. Ferguson of Corvallis, Oregon, all of whom have permitted me to examine the material of this group in their respective collections. I am greatly indebted to Dr. V. V. Gussakovskij of the Zoological Institute of the Academy of Sciences of the U. S. S. R., at Leningrad for sending me genotypic material of *Ammoplanops* and *Ammoplanellus.*

To the American Philosophical Society and the Academy of Natural Sciences of Philadelphia I wish to express my appreciation of the grant and financial support which rendered possible the Southwest Orthoptera Survey of 1937 of the latter organization.

TIMBERLAKENA[5] new genus

This interesting and anomalous genus is clearly a member of the same complex as *Ammoplanus* and *Spilomena* but is distinguished from both these genera, as well as practically all others in the Pemphredonini, by the almost veinless hind wings with complete absence of closed cells with the exception of the costal one, a character which it shares with *Xysma.* From that genus, however, *Timberlakena* is differentiated by the different type of venation in the fore wing, the episternal suture descending verti-

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[3] *Cf.* Proc. Acad. Nat. Sci. Phila., LV, pp. 16-18, (1903) and *Idem,* LXI, pp. 112-114, (1909), for an account of the localities involved.

[4] This material was collected by Messrs. James A. G. Rehn, John W. H. Rehn and the author who formed the personnel of this expedition.

[5] Dedicated to Dr. P. H. Timberlake of Riverside, California, in recognition of his work on the Encyrtidae and the bees of California, and who also collected the material upon which this interesting and distinctive genus is based.

cally from below the tegulae instead of from beneath the pronotal tubercles, and the depressed rather than compressed apical segments of the abdomen.

Generic Characters.—Minute forms. Head subquadrate, longer than broad in anterior aspect, transversely linear-elliptical in dorsal aspect; eyes more coarsely facetted anteriorly than posteriorly, the inner orbits subparallel, somewhat arcuate, truncate below; malar space wanting or reduced to a mere line; vertex subquadrately arched and subtruncate posteriorly, extending above dorsal margins of eyes for a distance of about one-fourth their length; ocelli arranged in a subequilateral triangle, the median ocellus about on a line with the dorsal margins of the compound eyes; temples moderately wide above, tapering ventrad. Antennae thirteen-segmented in males, twelve-segmented in females, situated very low on face just above dorsal margin of clypeus, about as far from each other as from the nearest eye margin. Clypeus narrow, transverse, linear or fusiform. Labrum subquadrate and emarginate medio-apically in females, transversely subrectangular and retuse medio-apically in males. Mandibles simple, subfalcate, apex acute; inner margins with a small tooth just before apex, otherwise edentate; lower margin simple, entire. No psammophore present.

Thorax with the pronotum situated below the level of the mesonotum and narrower than it; pronotum narrow, transverse, rounded and gently declivous anteriorly to level of neck, prothoracic tubercles attaining the tegulae. Mesonotum strongly arched anteriorly, rounded and vertically declivous there to the level of the pronotum which it tends to overhang somewhat, the anterior margin evenly arcuate in dorsal aspect; notauli and parapsidal furrows sometimes weakly indicated on anterior fourth; scutellum flat, about one-half the length of the mesonotum, the anterior margin with a transverse consute impression medially; postscutellum flat, about one-half the length of the scutellum. Mesopleura rounded anteriorly, without an epicnemium; omauli, sternauli and episternauli absent, episternal suture vertical from below the tegulae; posterio-discally with a large conspicuous pit. Metapleura narrow, oblique, separated from mesopleura and propodeum by distinct sutures. Propodeum about as long as scutellum, flat above, vertically to obliquely truncate behind; propodeal spiracles large, linear, transverse to transversely oblique in position, situated on the dorsolateral edges less than their own length from anterior margin, extending from dorsal face down onto lateral faces of the propodeum.

Legs with the fore femora semilunate, the upper margin straight or weakly arcuate, the lower margin strongly and evenly arcuate; middle and hind femora subfusiform and somewhat incrassate apically; the middle pair furnished with one apical calcar, the hind tibiae with the posterior margins simple, and apically with two inconspicuous calcaria.

Fore wings with the stigma large, ovate; the marginal cell short, oblique as in *Ammoplanus,* open apically, the costal vein present or absent distad of the stigma, the radial vein never attaining the costal margin; one or two transverse cubital veins present, the cubitus present or absent distad of the recurrent vein; basal vein strongly sinuous as in *Ammoplanus*. Hind wings with subcostal vein present in entirety; median vein present either in entirety along with evident stubs of the radial, cubital and transverse median nervures, or apparent as only a small stub at base with no trace of these other veins, otherwise without veins; no closed cells present save for the costal one; anal lobe large and obtrigonal as in *Ammoplanus*.

Abdomen sessile, oval, subdepressed, not appreciably constricted between the segments; tergites folded under roundly to the venter and imbricate with the sternites; pygidium lacking in both sexes; apical sternites of males usually simple and not modified, the last sternite terminating in a more or less linguiform process which is minutely serrate apically.

GENOTYPE: *Timberlakena (Timberlakena) nolcha* new species.

Remarks.—The present genus is definitely related in a number of respects to both *Ammoplanus* and *Spilomena*, combining certain particular features of both, yet displaying idiocratic characteristics which stamp it as indubitably discrete. The mesopleura and the venation of the fore wing of *Timberlakena* are constructed upon essentially the same basic pattern as in *Ammoplanus*, though differing from it in the latter character by either the presence of the first transverse cubital vein or the absence of the second abscissa of cubitus. In addition to these venational differences, *Timberlakena* is distinguished from *Ammoplanus* by the vertex being only moderately produced above the compound eyes and with the median ocellus situated on a line with their dorsal margins and by the relatively simple apical sternites of the males, agreeing in these respects with *Spilomena*. However, aside from the venation, *Timberlakena* is separable from the latter by the episternal suture of the mesopleura descending vertically from below the tegulae and by the depressed abdomen; in *Spilomena* the episternal suture passes ventrad from below the pronotal tubercles and the abdomen is cylindrical in cross section. Finally, the shape and position of the propodeal spiracles of the present genus is quite distinctive and unlike that of any other member of the Ammoplanoid complex. In *Timberlakena* they are relatively large for the group, linear with a tendency toward becoming arcuate, transverse in position and situated on the laterodorsal margin, extending from the dorsal surface down onto the lateral face and placed less than their distance from the anterior margin of the propodeum. The genus *Timberlakena* is without doubt the most highly modified group as yet known in the Ammoplanoid complex.

Distribution.—The present genus is a Sonoran one, confined largely to the Mohave and Colorado Deserts and neighbouring regions of southern California, so far as known at present. Further intensive collecting will no doubt reveal its presence in southwestern Arizona, Baja California and northern Sonora.

Subgenera.—Within the genus are three distinct groups which give every appearance of being natural entities. Their most obvious differential features lie in the venation of the fore and hind wings but these characters are supported by additional details in the structure of the clypeus, the pronotum, the propodeum and the shape of the abdominal sternites of the males. I have chosen, therefore, to regard these groups as discrete subgenera. The subgenus *Riparena* is the most generalized of the three, with *Mohavena* occupying a position somewhat intermediate between it and the highly specialized *Timberlakena* which represents the extreme in development in the Pemphredonids. The subjoined key will serve to separate these three subgenera.

Key to the Subgenera of Timberlakena

1. Hind wings with the median vein in entirety and stumps of radius, cubitus and the transverse median veins present; fore wings with two transverse cubital veins and two closed submarginal cells present; clypeus of both sexes more or less excised or emarginate. *Riparena* new subgenus

Hind wings with the median vein present as only a short stub at base, no traces of the radial, cubital or transverse median veins; fore wings with one or two transverse cubital veins and with one or no closed submarginal cells; clypeus not emarginate but produced into a short broad truncate lobe, at least in males 2

2. Fore wings with the costa present distad of stigma; two transverse cubital veins present, usually no closed submarginal cells; propodeum canaliculate; pronotum longitudinally sulcate; females with a tarsal comb ....*Mohavena* new subgenus

Fore wings with costa absent distad of stigma and ony one transverse cubital vein present; propodeum not canaliculate; pronotum not sulcate; females without a tarsal comb, or at most with merely the vestiges of one ....*Timberlakena* new subgenus

RIPARENA[6] new subgenus

The relatively complete venation of the fore wing and the presence in its entirety of the median vein along with stubs of the radial, cubital and transverse median nervures in the hind wing indicate that the present subgenus is probably the most generalized group of the genus. Furthermore, the last abdominal sternite of the males of *Riparena* does not terminate medio-apically in as marked a linguiform process as in *Mohavena* and *Timberlakena* in the restricted sense. On the other hand, the males of these two latter subgenera lack the curious caudally projecting, transverse narrow subreniform semipellucid flange on the fifth abdominal sternite, a feature which is apparently very characteristic of the males of the present group. The chief differential features of *Riparena* have been given in the foregoing key.

Subgeneric Characters.—In addition to the characters given under the generic diagnosis, the hind wings have the median vein present in its entirety with short stumps of the radial, cubital and transverse median nervures evident; fore wings with costal vein distinct and present for a distance distad of stigma, the radial vein not reaching the costal margin, the marginal cell thus open apically; two transverse cubital veins present and strongly divergent posteriorly; first submarginal cell large and elongate, twice the size of the small equilaterally trapezoidal second one, both submarginal cells closed by the presence of a second abscissa of cubitus. Pronotum not longitudinally sulcate. Propodeum flat discally, or at most very weakly canaliculate medially. Clypeus more or less excised or emarginate medially in both sexes. Males with a caudally projecting, transverse narrow subreniform semipellucid flange along posterior margin of the fifth abdominal sternite, the last sternite not produced apically into as distinct a median linguiform process as in *Mohavena* and *Timberlakena* in the restricted sense. Females without a tarsal comb on the fore tarsi or at most with merely the vestiges of one apparent.

GENOTYPE: *Timberlakena* (*Riparena*) *cahuilla* new species.

There is but one species known at present which is referable to the subgenus *Riparena*.

Timberlakena (Riparena) cahuilla[7] new species

(Pl. XV, figs. 1, 2; pl. XVI, fig. 14.)

The present species has the superficial facies of *Timberlakena* (*Mohavena*) *yucaipa* but lacks the brilliant shining habitus of that more northernly distributed form, as well as differing markedly from it in the wing venation and other subgeneric features.

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[6] After Riverside County in southern California.

[7] After the Cahuilla Indians of the Colorado Desert region of southern California.

Type.— ♀ ; Palm Springs, Riverside County, California. May 26, 1932. (P. H. Timberlake on *Phacelia distans* [Wild-heliotrope]). [Academy of Natural Sciences of Philadelphia, Type no. 4204].

Female.—2.5 mm. long. Black; mandibles except apices which are rufous, labrum, palpi, pedicel apically, flagellum beneath, all tibiae and femora at knees, all tibiae apically and all tarsi beneath, fulvous; tegulae and axillary sclerites, fuscous. Wings clear hyaline; stigma and veins fuscous.

Head subquadrate, slighter longer than wide in anterior aspect, fulgid to subopaque; lower half of front minutely and finely longitudinally aciculate, becoming nitidous on upper portion and vertex; front and vertex with a series of well separated, minute setigerous punctures each bearing a short suberect aeneous setula; ocellar area and occipital region subopaque and subgranulose. Front flat; inner orbits shallowly sinuate, subparallel. Antennae short, reaching about to occiput, situated at dorsal margin of clypeus; scape slender, somewhat obterete, elongate, about one-half as long as eyes; pedicel cylindrical, elongate, subequal in length to the first two flagellar segments; flagellum finely puberulent, last flagellar article elongate, terete, longer than the two preceding segments combined. Clypeus nitidous, glabrous, very narrow and transversely linear, about one-twelfth as long as the eyes; medio-apically with a broad transverse rectangular excision, at each latero-apical corner of which, directly under the antennal sockets, is a short obtuse tooth, laterad of this the apical margin is obliquely sinuous; preapically particularly in the clypeal emargination with a transverse row of long declivent ammochaetae. Labrum nitidous, glabrous, subrectangular and filling the clypeal emargination; the latero-apical angles broadly rounded; medio-apically distinctly emarginate. Mandibles subfalcate with the apex acute, preapically on inner margin with a small tooth; inner and outer margins otherwise edentate and with short ammochaetae

Thorax with pronotum narrow and transverse, narrower than mesonotum and situated below level of it, the anterior margin rounded and gently declivous to neck, the dorsal surface fulgid and with indistinct transverse aciculations, the tubercles reaching the tegulae. Mesonotum fulgid; with very fine well separated setigerous punctures each bearing a suberect aeneous setula; roundly arched anteriorly to level of pronotum which it tends to overhang somewhat, anterior margin evenly and broadly arcuate in dorsal aspect; notauli evident on anterior fourth; scutellum and postscutellum punctured like mesonotum, the former with a transverse consute impression along anterior margin. Mesopleura rounded anteriorly, no epicnemium; the episternal suture subconsute and descending vertically from below the tegulae; prepectus punctured and clothed like mesonotum, caudad of episternal suture relatively glabrous, fulgid and with obscure horizontal semi-aciculations. Metapleura oblique, rectangular, separated from mesopleura and propodeum by consute sutures; fulgid to subopaque, the surface with fine horizontal striae. Propodeum about as long as scutellum; dorsal surface flat, glabrous, opaque, finely granulate, basally with a poorly defined trigonal area which is minutely subrugulose, particularly at anterior margin, medially with a very faint, broad longitudinal subfoveolate canalicula; posterior face vertical or almost so, fulgid, nitidous discally becoming subgranulose toward lateral and dorsal margins, sparsely clothed with short reclivous whitish pubescence, discally with an obpyriform fovea; lateral faces subfulgid to subopaque, finely granulate. Legs clothed with fine, short decumbent whitish pubescence; fore tarsi hirsute but without a tarsal comb.

Abdomen fulgid to subopaque, sessile, oval, subdepressed; tergites with fine transverse aciculations, the first five glabrous except for a transverse submarginal row of short reclivous setulae; last tergite opaque, with fine whitish pile, no pygidial area present; sternites with sparse appressed aeneous pubescence, the first five with a fine microscopic transverse reticulate sculpture.

Allotype.—♂; Topotypical, same data as type. [Academy of Natural Sciences of Philadelphia].

Male.—2.4 mm. long. Similar to female except as follows. Black; lateral lobes of clypeus and mandibles except apices of latter which are rufous, eburneous; clypeus medially and labrum apically, castaneous; flagellum luteous beneath; anterior tibiae and tarsi, fulvous; middle and hind tibiae at knees and apex and tarsi, ochraceous.

Clypeus narrow, transverse, linear, about one-eighth the length of the eyes, flat, the apical margin trisinuate; labrum short, transversely rectangular, the latero-apical corners rounded, the medio-apical margin retuse.

Abdomen like female; last tergite without a pygidial area; fifth sternite with a very narrow, transverse, subreniform, semi-pellucid flange projecting caudad along posterior margin; last sternite terminating medio-apically in a short, subacuminate process which is serrulate and hirsute at apex.

Paratypes.—4 females, as follows:

CALIFORNIA: 3 ♀; Palm Springs, Riverside County; May 26, 1932; (P. H. Timberlake; on *Phacelia distans* [Wild-heliotrope]). 1 ♀; Box Canyon,[8] Riverside County; April 11, 1937; (P. H. Timberlake; on *Phacelia crenulata*). [All Timberlake.]

Distribution.—The present species is apparently a vernal form, probably generally distributed throughout the Lower Sonoran zone in the Colorado Desert and neighbouring regions of southern California.

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[8] Box Canyon is in the Salton depression some ten or fifteen miles south of Mecca. Highway 60 formerly passed through this canyon but now cuts across the country further north and comes out near Indio.

MOHAVENA[9] new subgenus

This subgenus is an intermediate one between *Riparena* and the typical one, combining certain features of both yet quite discrete from each. The sum total of its characters indicates that its affinities lie more with *Timberlakena* than with *Riparena,* both having arisen in all probability from a common stock. This relationship with *Timberlakena* is attested by the similarity in shape of the clypeus, the eighth abdominal sternite of the males and the venation of the hind wings. The foregoing key to subgenera will serve to distinguish *Mohavena* from the other subgenera of *Timberlakena.*

Subgeneric Characters.—In addition to the characters given under the generic diagnosis, the hind wings have the median vein preserved as only a small inconspicuous stub at the base and no trace of the radial, cubital and transverse median veins is evident; fore wings with the costa present for a short distance distad of the stigma and two transverse cubital veins present, the second abscissa of cubitus absent and no closed submarginal cells present in fore wing. Clypeus, at least in males, not emarginate or excised but produced medially into a short broad truncate lobe; pronotum longitudinally sulcate. Propodeum canaliculate on dorsal surface. Females with an evident tarsal comb on fore tarsi. Males with the last abdominal sternite produced into an elongate linguiform process medio-apically.

GENOTYPE: *Timberlakena* (*Mohavena*) *yucaipa* new species.

The subgenus *Mohavena* contains at present only the following species.

Timberlakena (Mohavena) yucaipa[10] new species

(Pl. XV, figs. 4, 5; pl. XVI, fig. 13.)

This species bears a somewhat superficial resemblance to the more southernly distributed *Timberlakena* (*Riparena*) *cahuilla* but in addition to the markedly different venation and other subgeneric features is readily distinguished from that form by its brilliant shining habitus and other characters as given in the following description.

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[9] After the Mohave Desert of Southern California.

[10] After Yucaipa, a former site of the Serrano Indians, east of Redlands at the foot of the San Bernardino Mountains and a little south of the type locality of the present species.

Type.—♀; Mountain Home Creek,[11] San Bernardino Mountains, San Bernardino County, California. July 4, 1935. (P. H. Timberlake; on *Eriodictyon trichocalyx* [Yerba Santa,[12]]). [Academy of Natural Sciences of Philadelphia, Type no. 4203].

Female.—2.5 mm. long. Shining black; mandibles except apices which are rufous, labrum and clypeus laterally, croceous; clypeus medially, badeous; scapes apically, pedicel, first few flagellar articles beneath, and fore tarsi, luteous; all femora and tibiae at knees, tibiae apically and tarsi beneath, ochraceous; tegulae and axillary sclerites, fuscous. Wings clear hyaline, irridescent; stigma brunneous, pellucid at base; veins light fulvous.

Head fulgid; lower half of front very finely longitudinally aciculate and together with vertex with fine regularly disposed but well separated sparse acupuncturation; occiput and temples nitidous. Front flat; inner orbits shallowly sinuate, subparallel. Antennae reaching about to occiput; scape slender, elongate, cylindrical, about one-half the length of eye; pedicel slender, obterete, longer than the first segment of flagellum; flagellum finely pubescent, last segment simple, terete, about twice as long as penult article. Clypeus nitidous, narrow and transversely linear, inconspicuously keeled discally, produced medially into a short, broad subtruncate lobe, the apical margin of which is shallowly sinuate, lateral lobes of clypeus with apical margins shallowly sigmoid and provided with a row of short declivent ammochaetae. Labrum subquadrate; the lateral margins arcuate and converging somewhat distad; medio-apically with a deep acute emargination; basally with two pellucid fenestrae. Mandibles falcate; apex simple, acuminate; inner margin with a small pre-apical tooth, otherwise edentate; lower margin simple, edentate.

Thorax fulgid; pronotum narrower than mesonotum and situated below level of it, rounded and gently declivous anteriorly to level of neck, medially with a shallow longitudinal strigate sulcus. Mesonotum strongly arched and with fine scattered acupuncturation and sparse puberulent pile anteriorly, remainder glabrous and nitidous; notauli evident on anterior third; scutellum and postscutellum glabrous and nitidous, the former tumid discally, the latter flat. Mesopleura nitidous, rounded anteriorly, no epicnemium; the episternal suture consute and descending vertically from below the tegulae. Metapleura shining to subopaque, subgranulose below. Propodeum fulgid to subopaque; dorsal face strongly and transversely striate, canaliculate medially, the groove margined laterally by parallel longitudinal carinulae; posterior face laevigate to weakly and transversely striate, medially above with an obcuneate fovea; lateral faces obliquely striate. Fore tarsi with evidences of a tarsal comb.

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[11] This is a tributary of Mill Creek about twelve miles northeast by east of Redlands. *Cf.* Grinnell [The Biota of the San Bernardino Mountains, *Univ. Calif. Publ. Zool.*, v, p. 8, (1908)] for a description of this locality.

[12] *Eriodictyon trichocalyx* is a characteristic plant of the Upper Sonoran and Transition zones in this region. [*Cf.* Grinnell, Univ. Calif. Publ. Zool., v, pp. 5-7, (1908).]

Abdomen fulgid, oval, subdepressed; with fine microscopic transverse aciculation; first three tergites glabrous save for a transverse row of submarginal setulae, remaining tergites sparsely pubescent; last tergite without a pygidium; first three sternites sparsely pubescent, the remainder more heavily clothed with fine appressed puberulent pile.

Allotype.—♂; Topotypical, same data as type. [Academy of Natural Sciences of Philadelphia].

Male.—2.25 mm. long. Similar to female except as follows. Black; clypeus, lower half of inner orbits with a large subtrigonal spot to antennal insertions, front medially above antennal insertions, labrum, palpi, mandibles except apices which are rufous, fore legs distad of coxae, middle tibiae and tarsi, sulphureous; flagellum and pedicel fuscous above, fulvous beneath; hind femora and tibiae at knees, hind tibiae apically, and tarsi, fulvous.

Clypeus narrow and transversely irregularly hexagonal, the medio-apical margin broadly truncate, the disc subtumid. Mesonotum more distinctly punctate and more strongly pubescent anteriorly than in female, finely and circularly aciculate discally; metapleura fulgid, horizontally substriate. Propodeum with dorsal face immediately following postscutellum with a few short longitudinal rugulae, otherwise minutely subrugulose and tending to obscure somewhat the transverse striae, canaliculate medially as in female. Abdomen as in female but the sternites subopaque and finely punctate; last sternite elongate, linguiform, the apical margin minutely serrulate.

Paratypes.—6 females, as follows:

CALIFORNIA: 2 ♀; Mohave River at Deep Creek, San Bernardino Mountains, San Bernardino County; August 14, 1936; (P. H. Timberlake; on *Eriogonum gracile*); [Timberlake]. 4 ♀; Mount San Antonio, San Bernardino County, elevation 2000 feet; August 21, 1920; (P. H. Timberlake; on *Eriogonum fasciculatum* [California Buckwheat]); [Timberlake].

Distribution.—The present distinctive species is apparently a middle to late aestival form of the Mohave Desert and the San Bernardino Mountains, ranging from the upper reaches of the Lower Sonoran zone of the former well into the Upper Sonoran region of the latter.

TIMBERLAKENA new subgenus

In a subgeneric sense, the name *Timberlakena* is restricted to that group of species containing the genotype and having in common with it certain features given below in the subgeneric characterization. The chief differential features of the subgenus have been given in the foregoing key.

This, the typical group of *Timberlakena,* is most closely allied to *Mohavena,* agreeing with it in the general form of the clypeus and the eighth abdominal sternite of the males and in the similar venation of the hind wing. It is without question the most highly developed group of the genus, or for that matter the Pemphredonids as a whole.

Subgeneric Characters.—In addition to the characters given in the generic diagnosis, the hind wings have the median vein preserved as only a small inconspicuous stub at the base of the wing and no trace of the radial, cubital or transverse median nervures evident; fore wings with the costa absent distad of the stigma and only one transverse cubital vein present, the second abscissa of cubitus present or absent. Clypeus, at least in males, not emarginate but produced medially into a short, broad truncate lobe. Pronotum not longitudinally sulcate. Propodeum not canaliculate on dorsal surface. Females without a tarsal comb on fore tarsi, or at most with merely the vestiges of one apparent. Males with the fifth sternite simple and the last sternite terminating medio-apically in an elongate linguiform process.

GENOTYPE: *Timberlakena (Timberlakena) nolcha* new species.

Component Species.—Two species are known at present which may be referred to the nominate group of *Timberlakena.* One of these is separable into two distinct geographic races. These forms may be distinguished by the following table.

Key to the Forms of the subgenus Timberlakena

1. Fore wings with a distinct second abscissa of cubitus almost closing the submarginal cell; propodeum with a median longitudinal carinula on the dorsal face .... *ocha* new species

   Fore wings without a second abscissa of cubitus, the submarginal cell widely open; propodeum without a median longitudinal carinula on the dorsal face 2

2. Venation and stigma of fore wing eburneous, the stigma with a large pellucid fenestra discally; posterior and lateral faces of propodeum strongly striate; livery of males pallid eburneous.
   nolcha nolcha new subspecies

   Venation and stigma of fore wings fulvous, the stigma concolorous and without a pellucid fenestra discally; posterior and lateral faces of propodeum weakly striate; livery of males deep yellow, almost sulphureous .... *nolcha hualga* new subspecies

Timberlakena (Timberlakena) nolcha[13] new species

This species is divisible into two geographic races which are differentiated in the foregoing key and discussed separately below.

Timberlakena (Timberlakena) nolcha nolcha[13] new subspecies
(Pl. XV, figs. 7, 8; pl. XVI, fig. 15.)

The eburneous venation and stigma, the latter of which is provided with a pellucid fenestra discally, distinguish the nominate form of *nolcha* from all other species of this subgenus.

Type.— ♂ ; Box Canyon,[14] Riverside County, California. April 13, 1934. (P. H. Timberlake; on *Acacia Greggii* [Cat's-claw]). [Academy of Natural Sciences of Philadelphia, Type no. 4194].

Male.—2.5 mm. long. Black with greenish reflections; the following eburneous: mandibles except apices which are fulvous, palpi, labrum, clypeus, lower half of inner orbits with a large subtriangular macula to antennal sockets, and medially between the latter, tegulae and axillary sclerites, scape, pedicel, pronotal tubercles, fore legs entirely, middle legs distad of trochanters, hind femora broadly annulate at apex, and hind tibiae and tarsi entirely. Flagellum sordid eburneous becoming fulvescent apically. Wings clear hyaline, iridescent; stigma eburneous with a large semilunate pellucid fenestra discally, veins eburneostramineous.

Head glabrous, fulgid, suborbicular in anterior aspect; front with fine close longitudinal aciculations, vertex subcoriaceous, occiput and temples subnitidous to subcoriaceous. Front flat; inner orbits subparallel, eyes truncate below, reaching almost to base of mandibles, the malar space negligible; vertex extending in a low even arch above the dorsal margins of the eyes for one-fourth their length; ocelli in a low triangle, the median ocellus on a line with the dorsal margins of the eyes, ocellar area slightly elevated, ocellocular line a little longer than the postocellar line. Antennae situated low on face along dorsal margin of clypeus, nearer each other than the nearest eye margin, reaching about to pronotum; scape elongate, one-half the length of the eye, obterete; pedicel elongate, cylindrical, subequal in length to the first two flagellar segments; flagellum finely puberulent, the last article simple, terete, subequal in length to the two preceding segments combined. Clypeus nitidous, transverse, subfusiform, subtruncate medially at base and apex, length medially one-fourth that of eye; flat laterally to tumid medially, the disc gently elevated into a small indistinct subtriangular platform, distal margin of the median lobe furnished with a row of setigerous punctures each bearing a short declivous setula and obscurely repand medio-apically, the distal margin arcuate laterally. Labrum flat, narrow, subtrapeziform, slightly wider apically than basally, the distal margin shallowly excised and obtusely angulate medio-apically, the latero-apical angles rounded, apical margin furnished with a row of short setulae. Mandibles subfalcate, the lower margin entire, edentate, apex acuminate, inner margin with a small preapical tooth.

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[13] After the Nolcha [*i.e.* Nyo'ilcha] or Sun Gens of the Mohave Indians of southern California.

[14] Box Canyon is in the Salton depression some ten or fifteen miles south of Mecca. Highway 60 formerly passed through this canyon but now cuts across the country further north and comes out near Indio.

Thorax fulgid; pronotum situated much below level of the mesonotum and much narrower than it, with fine transverse microscopic reticulate aciculation and an indistinct linear fovea discally, without an apparent dorsal surface but gently declivous from anterior margin of mesonotum to neck, the tubercles attaining the tegulae. Mesonotum strongly arched anteriorly and vertically declivous to level of pronotum; anterior half finely acupunctate and clothed with a fine appressed puberulent, light pile, the remainder relatively glabrous and subcoriaceous; scutellum and postscutellum nitidous and slightly tumid discally, anterior margin of former with a transverse impressed consute furrow. Mesopleura rounded anteriorly, without an epicnemium, the prepectus finely acupunctate and clothed with a pile similar to anterior portion of mesonotum; caudad of the subconsute episternal suture glabrous, nitidous, the episternal pit distinct; metapleura glabrous, subfulgid, finely horizontally aciculate. Propodeum fulgid, glabrous; dorsal face microscopically granulate to finely transversely striate, medio-apically with a shallow inconspicuous obpyriform fovea; posterior face with fine strong transverse, somewhat arcuate, aciculate striae, medially with a vertical sulcus which broadens out above into an obpyriform fovea; lateral faces obliquely striate.

Abdomen sessile, oval, somewhat depressed, fulgid; tergites with an inconspicuous microscopic transverse aciculation and glabrous save for a transverse subapical row of short decumbent setulae; last tergite with fine inconspicuous puberulent light pile, no pygidial area present; sternites subopaque, with sparse scattered acupuncturation and short puberulent pubescence, all sternites simple, unmodified, the last terminating in a median linguiform process which is pubescent and serrulate apically.

Allotype.—♀; Box Canyon, Riverside County, California. April 13, 1934. (P. H. Timberlake). [Academy of Natural Sciences of Philadelphia].

Female.—2.5 mm. long. Similar to male except as follows. Black with aeneous and greenish reflections but generally devoid of the eburneous livery of male; mandibles except apices which are rufous, palpi, labrum, scape apically, pedicel, flagellum beneath (fuscous above), tegulae, fulvous; clypeus castaneous; fore femora on apical half, all of fore tibiae, middle and hind tibiae annulate at base and apex, all tarsi, stramineous. Wings as in male.

Head as in male but the clypeus narrow, linear, transverse, about one-sixth the length of the eye, very inconspicuously produced medially into a broad and squarely truncate lobe the apical margin of which is provided with a transverse row of short ammochaetae. Labrum flat, subrectangular, the latero-apical corners broadly rounded, medio-apically with an acute excision giving it the appearance of being bilobed.

Thorax entirely glabrous, subnitidous; mesonotum more gradually arched anteriorly than the male; fore tarsi with a very weak tarsal comb; otherwise like male.

Abdomen with last tergite without a pygidial area; otherwise generally as in male.

Paratypes.—11 males, 5 females, as follows:

CALIFORNIA: 2 ♂; Box Canyon, Riverside County; April 13, 1934; (P. H. Timberlake; on *Acacia Greggii* [Cat's-claw]). 1 ♂; Box Canyon; April 13, 1934; (P. H. Timberlake; on *Olneya Tesota* [Ironwood]). 1 ♀; near Indio, Riverside County; April 3, 1935; (H. J. Quayle; on mesquite [*Prosopis chilensis*]). 1 ♀; La Quinta,[15] Riverside County; March 17, 1934; (P. H. Timberlake; on *Larrea divaricata* [Creosote Bush]). 1 ♂; six miles south of Palm Springs, Riverside County; June 8, 1937; (P. H. Timberlake; on *Eriogonum trichopes*). 1 ♂; Palm Springs, Riverside County; April 9, 1932; (P. H. Timberlake; on *Prosopis chilensis* [mesquite]). 1 ♂; Helendale, San Bernardino County; September 14, 1935; (P. H. Timberlake; on *Cleomella serrulata* [Stinkweed]). 1 ♂, 1 ♀; Cushenbury Springs,[16] San Bernardino County, elevation 4000 feet; September 1, 1936; (P. H. Timberlake; on *Lepidospartum squamatum* [Scale-broom]). 1 ♂; two miles west of Barstow, San Bernardino County; July 7, 1938; (P. H. Timberlake; on *Eriogonum trichopes*). [All Timberlake.] 1 ♀; Yuma Indian Reservation, (across Colorado River from Yuma, Arizona), Imperial County; May 5, 1918; (J. C. Bradley; swept from flowers of a composite along bank of river at end of railroad bridge); [Cornell]. 1 ♀; Experiment Farm, Imperial County; June 11, 1912; (J. C. Bridwell); [U. S. N. M.].

IDAHO: 2 ♂, 1 ♀; Hagerman, Gooding County; July 11, and August 11, 1922; (David E. Fox; on *S*[*alsola*] *pestifer* [Russian Thistle]); [U. S. N. M.].

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[15] La Quinta is eight or ten miles west of Indio at the base of the Santa Rosa Mountains.

[16] *Cf.* Grinnell [1908, Univ. Calif. Publ. Zool., v, p. 21] for a description of this locality.

Distribution.—The nominate form of this species is distinctly more xerothermal than the atypical one. It is primarily eremian in distribution and occurs throughout the Lower Sonoran zones of southern California and Idaho, flying from the middle of March until May in the Colorado Desert and adjacent areas and as late as the middle of September in the higher and more northern Mohave Desert region. On the hot lava plains of southern Idaho, it apparently flies throughout the summer.

Timberlakena (Timberlakena) nolcha hualga[17] new subspecies

This subspecies is separable from the nominate form of the species of the Lower Sonoran zone by the fulvous venation of the fore wing and the concolorous stigma devoid of a pellucid fenestra discally.

Type.— ♂ ; San Lucas, Monterey County, California. August 20, 1935. (P. H. Timberlake; on *Eriogonum gracile*). [Academy of Natural Sciences of Philadelphia, Type no. 4195].

Male.—2.5 mm. long. In its general features the present subspecies is identical with the typical form except that the venation and stigma of the fore wing are fulvous, the latter being concolorous throughout and lacking the large semilunate pellucid fenestra discally that is so characteristic of *nolcha nolcha*. The livery, particularly of the head and legs, is distinctly yellow, almost sulphureous, rather than eburneous, and the mesonotum and prepectus are more sparsely punctate and pubescent than in the typical subspecies, while the propodeum is much more delicately sculptured than in the nominate form, the striae of the posterior and lateral faces being very weak and almost obsolete.

Allotype.— ♀ ; Mohave River at Deep Creek, San Bernardino Mountains, San Bernardino County, California. August 14, 1936. (P. H. Timberlake; on *Eriogonum gracile*). [Academy of Natural Sciences of Philadelphia].

Female.—This sex exhibits the same general differential characters as the male. The clypeus, labrum and mandibles are a deep uniform fulvous, with the livery of the legs much less extensive than in the typical form.

Distribution.—This striking late aestival form is a race apparently confined to the higher levels and Upper Sonoran zone of the San Bernardino Mountains, the Coast Range and Salinas Valley regions.

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[17] After the Hualga [*i.e.* the Hoalya] or Moon gens of the Mohave Indians.

Timberlakena (Timberlakena) ocha [18] new species
(Pl. XV, fig. 9; pl. XVI, fig. 16.)

The present species has the superficial habitus of *nolcha hualga* but is differentiated from it as well as the nominate form of that species by the presence of a second abscissa of cubitus in the fore wing and a median longitudinal carinula on the dorsal face of the propodeum and also by the longer and more distinctly excised clypeus. In addition, *ocha* is distinguished from *nolcha nolcha* by the fulvous venation and concolorous stigma which in this species lacks the pellucid fenestra so characteristic of that subspecies.

Type.— ♀ ; Box Canyon,[19] Riverside County, California. April 13, 1934. (P. H. Timberlake; on *Olneya Tesota* [Desert Ironwood]). [Academy of Natural Sciences of Philadelphia, Type no. 4196].

Female.—2.5 mm. long. Black; mandibles except apices which are rufous, palpi, labrum, scape anteriorly and apically, pedicel, and basal flagellar articles beneath, all femora apically, all tibiae and tarsi, tegulae and axillary sclerites, luteous; all coxae and trochanters and femora basally, and flagellum above and apically, sordid testaceous. Wings clear hyaline, iridescent; stigma and veins dilute testaceous.

Head fulgid, suborbicular in anterior aspect; front discally and below with fine, close longitudinal aciculations, upper portion and vertex with fine, very sparse acupuncturation, occiput and temples nitidous. Front flat; inner orbits shallowly sinuate, converging slightly below; vertex extending in a low even arch above dorsal margins of eyes for one-fourth their length; ocelli in a low triangle, the median ocellus about on a line with the dorsal margins of eyes, ocellar area tumid, postocellar line a little more than half the length of the ocellocular line. Antennae situated low on face along dorsal margin of clypeus, nearer to each other than to nearest eye margin, reaching a little beyond occiput; scape somewhat obterete, very slightly bowed, one-half the length of the eye; pedicel cylindrical, subequal in length to first two flagellar articles; flagellum finely puberulent, the first segment very short, last segment elongate, terete, subequal in length to two preceding articles combined. Clypeus laevigate and microscopically subfavose, narrow, transverse, linear, length medially one-sixth that of eye, subtumid discally, slightly produced medially into a short broad subtruncate lobe, the apical margin of which is broadly, shallowly, and arcuately excised, with a submarginal row of setigerous punctures each bearing a short declivent ammochaeta; lateral lobes of clypeus with apical margins shallowly sigmoid, medially with a transverse row of short declivent ammochaetae. Labrum flat, subquadrate, the latero-apical angles rounded, emarginate medio-apically, the apical margin furnished with short setulae. Mandibles subfalcate, the lower margin entire, edentate, apex acute, inner margin with a small pre-apical tooth.

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[18] After the Ocha [*i. e.* Owich] or Raincloud Clan of the Mohave Indians of southern California.

[19] *Cf.* footnote 14 under *T.* (*Timberlakena*) *nolcha nolcha.*

Thorax fulgid; pronotum situated much below level of mesonotum and narrower than it, with fine indistinct transverse aciculations, and with a narrow transverse dorsal surface, the anterior margin rounded and thence gently declivous to level of neck. Mesonotum roundly arched anteriorly and vertically declivous to level of pronotum, subnitidous with a very sparse scattered series of minute setigerous acupunctures each bearing a very short light aeneous setula; scutellum and postscutellum glabrous and nitidous, the former tumid, the latter flat and with a few fine longitudinal aciculae laterally. Mesopleura glabrous, nitidous, rounded anteriorly and without an epicnemium; the episternal suture subconsute and descending vertically from below the tegulae; disco-posterior pit large and distinct. Metapleura fulgid, glabrous, subgranulose. Propodeum glabrous, subfulgid; dorsal surface medially with a large poorly defined trigonal microscopically favose area which is bisected for three-fourths its length by a longitudinal carinula, the apex of trigonal area at caudal margin of propodeum terminating in a shallow depression; posterior face obscurely transversely striate, with an obpyrifrom fovea dorsally above; lateral faces minutely subgranulate with oblique striae.

Fore wings as in *nolcha* but lacking a pellucid fenestra discally in stigma; a distinct second abscissa of cubitus present and almost reaching the transverse cubital nervure, the submarginal cell thus more or less closed.

Abdomen fulgid, sessile, oval, subdepressed; tergites with a transverse minute aciculate sculpture, the first three glabrous except for a transverse submarginal row of declivent setulae, remainder clothed with a very sparse, short, whitish puberulent pubescence; last tergite finely acupunctate discally, no pygidial area present; sternites with fine sparse acupuncturation and light pubescence.

Male.—Unknown.

This interesting little form of California's Colorado Desert is known only from the unique female.

AMMOPLANUS Giraud

1869. *Ammoplanus* Giraud, Ann. Soc. Ent. France, (4), IX, p. 469.
1931. *Ammoplanus* Gussakovskij, Bol. Soc. Españ. Hist. Nat., XXXI, p. 438.
1937. *Ammoplanus* Pate, Trans. Amer. Ent. Soc., LXIII, p. 98.

Nomenclatorial Remarks.—Gussakovskij in 1931 proposed the subgenus *Ammoplanellus*[20] for a single Transcaspian species which he knew then only from a unique female. Since that time, however, Dr. Gussakovskij has taken male representatives as well as additional females of *Ammoplanus* (*Ammoplanellus*) *chorasmius* Guss., and recently has very kindly sent me a pair. A study of this material together with the hitherto unknown female sex of the species which I described in 1937 has immediately revealed that I was in error in referring certain Nearctic forms to *Ammoplanellus*. The North American species *apache* and *lenape* which I previously placed in Gussakovskij's subgenus constitute a distinct and separate group which is characterized below.

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[20] Bol. Soc. Españ. Hist. Nat., XXXI, p. 442, (1931).

The subgenus *Ammoplanellus* is entirely an Old World entity, restricted to the Transcaspian and adjacent regions and South Africa, so far as I know at present.

PARAMMOPLANUS[21] new subgenus

1937. *Ammoplanellus* Pate [*nec* Gussakovskij], Trans. Amer. Ent. Soc., LXIII, p. 103.

This subgenus is intermediate in character between *Ammoplanellus* and the nominate group, combining certain features of both yet quite discrete from each. The venation of the wings of *Parammoplanus* is similar to that of *Ammoplanellus* but whereas the females of the latter group lack a pygidial area and the apical sternites of the males are simple and unmodified, the females of *Parammoplanus* are furnished with a distinct trigonal pygidium and the apical sternites of the males are modified, agreeing in these respects with the typical subgenus of *Ammoplanus*.

Subgeneric Characters.—Head subquadrate in anterior aspect, transversely oval-elliptical in dorsal aspect; eyes truncate below, reaching to bases of mandibles, inner orbits parallel or subparallel; vertex strongly arched, extending above the dorsal margin of the compound eyes for one-fourth or more their length; ocelli arranged in a subequilateral triangle, the median ocellus situated well above the dorsal margin of the compound eyes; temples moderately wide above, tapering ventrad; malar space absent or practically so. Antennae simple, situated very low on the face just above the dorsal margin of the clypeus. Clypeus narrow, transverse, more or less excised medially. Mandibles simple, unarmed below, apex acute, inner margin just before the apex with a blunt shoulder.

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[21] From παρά, beside + *Ammoplanus*.

Thorax with the pronotum short, narrow, transverse, narrower than the mesonotum and situated below the level of it; tubercles almost reaching the tegulae. Mesonotum arched anteriorly to the level of the pronotum but not thrust forward over the latter, anterior margin evenly arcuate in dorsal aspect; notauli and parapsidal furrows usually not evident anteriorly. Mesopleura anteriorly without an epicnemium; episternal suture descending vertically from below the tegulae; episternaulus absent or sometimes vaguely indicated; discoposteriorly without a pit or if this is present then very weak; propodeum flat above, truncate behind. Legs as in *Ammoplanus* in the restricted sense.

Fore wings with the costal vein absent distad of the stigma; the radial vein not attaining the costal margin, the margin cell thus broadly open; second transverse cubital vein present and slightly oblique; one closed submarginal cell present. Hind wings with the median cell closed.

Abdomen sessile, oval, depressed; females with a well defined trigonal pygidial area; males with the apical sternites modified, the fifth with a pair of prongs medio-apically.

GENOTYPE: *Ammoplanus* (*Ammoplanellus*) *apache* Pate, 1937 [=*Ammoplanus* (*Parammoplanus*) *apache* Pate].

Component Species.—The subgenus *Parammoplanus* contains the two Nearctic species which I previously referred to *Ammoplanellus*,—*Ammoplanus apache* Pate and *A. lenape* Pate. These together with other forms will be treated in a forthcoming revision of the Nearctic species of the genus *Ammoplanus* in this same general series.

AMMOPLANOPS Gussakovskij

1931. *Ammoplanops* Gussakovskij (in part), Bol. Soc. Españ. Hist. Nat., XXXI, p. 295.
1937. *Ammoplanops* Pate, Trans. Amer. Ent. Soc., LXIII, p. 121.

GENOTYPE: *Ammoplanops carinatus* Gussakovskij, 1931. (By original designation.)

Hitherto only one Nearctic form has been known which could be referred to *Ammoplanops*. In the material now before me, however, are six new species which are described on the following pages, along with additional records of the previously known form.

Species Groups.—The various species of *Ammoplanops* may be conveniently arranged in three distinct natural series or species groups according to the structure of the clypeus, the mandibles and the hypopygia of the males.

The Carinatus Group, which contains the genotype (*carinatus*) and probably also the two other Palaearctic species (*Ammoplanops laticeps* Gussakovskij and *A. tuberculifer* Gussakovskij),[22] is distinguished by the subadamantiform flat clypeus which is at most only tumid discally and truncate apically. The mandibles are simple and edentate on their lower margins and possess only the customary blunt preapical tooth on the inner margin. The hypopygium is elongate and tapering somewhat toward the apex which is either rounded and serrulate as in *carinatus*, or more or less subtruncate as in *laticeps* and *tuberculifer*. Furthermore, the ventral surface of the hypopygium is either furnished with a distinct high median longitudinal keel as in the first of these species, or strongly convex as in the latter two. In *carinatus* there is a weak transverse sulcus basally on the second abdominal sternite. Practically all the differential features of the Carinatus Group, which is entirely Old World in distribution, indicate that it is probably the most generalized complex of the genus.

The Moenkopi Group, which includes four closely related Nearctic forms (*cressoni, cockerelli, ashmeadi* and *moenkopi*), may be briefly characterized as follows. The clypeus is more or less tectate and adamantiform with the medio-apical margin tridentate and the median dorsal margin furnished with a porrect spine. The mandibles are simple and of essentially the same conformation as those of the preceding group but the hypopygium of the present complex is flat, elongate and spatulate with the apical margin serrulate. As in the Carinatus Group, only the second abdominal sternite has a transverse basal sulcus. In certain respects, the Moenkopi Group may be regarded as an intermediate one between the preceding and the following complex. It is possible that the genus *Pulverro* arose from some such ancestral stock as this.

The Vierecki Group, which comprises at present only three Nearctic species (*timberlakei, foxi* and *vierecki*), is distinguished by an unusual combination of diagnostic features. The clypeus is sublunate and flat with a raised nitidous and glabrous subtrigonal to subquadrate platform discally, the apical margin of which is truncate or repand. Like *Pulverro chumashano*, the mandibles are provided with a large subtrigonal or subquadrate tooth projecting at right angles to the lower margin while the inner margin, in addition to the customary preapical tooth, possesses another distinct dentiform process medially. The mandibles, moreover, are curiously and distinctively bowed basally. The hypopygium is elongate and linguiform, somewhat incrassate distad with the apex abruptly truncate and cuspidate medio-apically, while the second to fifth abdominal sternites have a transverse arcuate sulcus basally. This complex is without question the most highly developed group of the genus.

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[22] I have seen no material of either of these forms and place them tentatively in this group on the basis of Gussakovskij's original descriptions and figures. If they may not be referred to the group containing *Ammoplanops carinatus* Guss., of which I have before me male and female representatives through the courtesy of Dr. Gussakovskij, it will be necessary to erect a separate group for their reception since they do not appear to fit conveniently into either the Moenkopi or Vierecki Groups.

The females of at least the Nearctic representatives of *Ammoplanops* present a discouraging uniformity of structural detail and certain identification of some species can only be made by association with the corresponding males which may be readily separated by means of the subjoined key.

Key to the Nearctic Species of Ammoplanops

1. Males 2
   Females 8

2. Mandibles with a blunt tooth projecting medially at right angles to the lower ventral margin; hypopygium elongate, linguiform, incrassate distad, the apex abruptly truncate and cuspidate medio-apically; clypeus flat with a raised glabrous nitidous platform discally.
(Vierecki Group) 3

   Mandibles with the lower margin edentate; hypopygium elongate, flat, spatulate, the apex serrulate; clypeus more or less tectate, opaque, adamantiform and tridentate medio-apically ....(Moenkopi Group) 5

3. Clypeus with a porrect spinoid tooth at medio-dorsal margin, the apical margin truncate; sixth abdominal sternite more or less hirsute posteriorly, the caudal margin angularly excised; hypopygium without a median longitudinal groove ventrally 4

   Clypeus without a porrect spinoid tooth at medio-dorsal margin, the apical margin repand, the platform broader than long; sixth abdominal sternite glabrous, nitidous, concave discally, the caudal margin broadly and arcuately excised; hypopygium with a median longitudinal groove on the ventral surface; (Colorado Desert, California).
timberlakei new species

4. Dorsal surface of propodeum with three parallel longitudinal carinulae medially; clypeal platform as broad as or broader than long; first preapical mandibular tooth greatly dilated; sixth abdominal sternite strongly concave discally, posteriorly with a broad arcute sulcus and laterally on each side with a distinct strongly compressed elongate transverse tubercle; (Mohave Desert, California) ....*foxi* new species
   Dorsal surface of propodeum with two widely separated parallel carinulae medially; clypeal platform longer than broad; first preapical mandibular tooth only moderately dilated; sixth abdominal sternite moderately concave discally but without arcuate sulcus apically, laterally on each side with a small inconspicuous sharp tubercle; (New Mexico) ....*viereckí* new species
5. Clypeus bituberculate medially, without a median longitudinal cristate keel medio-apically; mandibles constricted basally, the lower margin bisinuate; (California) ....*cressoni* new species
   Clypeus with only one tubercle or porrect spinoid tooth at medio-dorsal margin, medio-apically with a median longitudinal cristate keel; mandibles not constricted basally, the lower margin evenly arcuate 6
6. Sixth abdominal sternite broadly emarginate distally and strongly tuberculate medio-apically; clypeus with the medio-dorsal margin armed with a minute tooth; (Arizona) ....*moenkopi* new species
   Sixth abdominal sternite shallowly emarginate distally and simple, not tuberculate medio-apically; clypeus with the medio-dorsal margin furnished with a distinct though small, porrect spinoid tooth 7
7. Clypeus with the medio-apical longitudinal cristate keel adnate for its entire distance, not free dorsally and projecting dorsad in the form of a retrorse barb; (Texas to California) ....*cockerelli* (Ashmead)
   Clypeus with the medio-apical longitudinal cristate keel free dorsally and projecting upward in the form of a retrorse barb; (California). *ashmeadi* new species
8. Clypeus yellow ....*viereckí* new species
   Clypeus black ....*cockerelli* (Ashmead)

Ammoplanops cressoni[23] new species (Pl. XV, fig. 3; pl. XVI, fig. 21.)

This interesting form of California's Colorado Desert is most closely related to *cockerelli* (Ashmead) with which it agrees in the shape of the hypopygium and many other features. However, although the clypeus is subadamantiform and subtectate with the apex furnished with a median dentoid process, the median longitudinal cristate keel that is so characteristic of *cockerelli* is lacking in *cressoni* and replaced by a discal tubercle, thus making the clypeus bituberculate. Moreover, the medio-apical tooth is concave in the present form rather than carinate as in *cockerelli*. The differential characters separating *cressoni* from the other known Nearctic species of *Ammoplanops* have been given in the foregoing key.

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[23] Dedicated to the late Ezra Townsend Cresson, Sr., as a slight tribute to his excellent work on the Aculeate Hymenoptera of western North America.

Type.—♂; Five and one-half miles northwest of Indio, Riverside County, California. April 9, 1936. (P. H. Timberlake; at flowers of mesquite [*Prosopis chilensis*]). [Academy of Natural Sciences of Philadelphia, Type no. 4200].

Male.—2.75 mm. long. Black; mandibles except the apices which are castaneous, palpi, fore femora apically, fore tibiae entirely, middle and hind tibiae broadly annulate at base and apex, and all tarsi, eburneous; pedicel and first four flagellar articles beneath, luteous, remainder fuscous; legs and axillary sclerites, brunneous. Wings clear hyaline; stigma, marginal vein, and apical two-thirds of costa and subcosta, testaceous, remaining venation eburneostramineous.

Head subquadrate in anterior aspect, fulgid; clypeus and lower half of front with a conspicuous appressed silvery puberulent pile; upper portion of front, vertex, occiput and temples relatively glabrous. Eyes reaching to bases of mandibles below; inner orbits repand, subparallel; vertex extending in a low even arch above dorsal margins of compound eyes for about one-sixth of their length; ocelli in a low triangle, median ocellus on a line with the dorsal margins of the compound eyes; front flat, together with anterior portion of vertex with fine well separated acupuncturation; vertex posteriorly and occiput subopaque and microscopically subgranulose. Antennae inserted slightly above dorsal margin of clypeus, reaching slightly beyond the occiput; scapes about one-third the length of eyes, straight, slightly incrassate distally; flagellum finely puberulent. Clypeus narrow and transversely subadamantiform and longitudinally subtectate, medially bituberculate, one tubercle spinoid and situated at upper median dorsal angle, the other placed discally, apically with a short, broad subtruncate lobe furnished medio-apically with a large rounded tooth, the latero-apical corners of the lobe acute and thus making clypeus apparently tridentate, apical margin of clypeus laterad of median lobe arcuate. Mandibles subfalcate, constricted basally in ventral aspect, apex acuminate, inner margin with a small preapical tooth and a larger obtuse one basally, outer margin bisinuate.

Thorax fulgid to subopaque; dorsally and ventrally with fine short sparse decumbent pubescence, pleura relatively glabrous. Pronotum situated much below level of mesonotum, without a distinct dorsal surface but gradually declivous from anterior margin of mesonotum to neck; tubercles almost attaining the tegulae. Mesonotum with fine sparse acupuncturation, strongly arched and vertically declivous anteriorly to level of pronotum, anterior margin evenly arcuate in dorsal aspect; notauli evident on anterior fourth; suture between mesonotum and scutellum impresesd and consute; scutellum and postscutellum punctured like mesonotum; mesopleura rounded anteriorly, without an epicnemium, cephalad of the subconsute episternal suture punctured like mesonotum, remainder subnitidous, the episternaulus weak. Metapleura and lateral faces of the propodeum glabrous, subfulgid and microscopically granulate. Dorsal surface of propodeum glabrous, fulgid, granulose, with a pair of well separated longitudinal parallel carinulae medially, laterad of which on each side are several somewhat irregular subparallel carinulae, margined posteriorly with a transverse carinula; posterior face fulgid, microscopically subgranulate, medially with a cuneiform foveate areole.

Abdomen oval, sessile, fulgid, slightly constricted between the segments; tergites and sternites with a microscopic transverse reticulation and very sparsely clothed with short scattered pubescence which is most noticeable on sternites and apical tergites; pygidium absent; second sternite with a transverse sulcus basally; sixth sternite nitidous, glabrous, concave discally, the apex sinuate; last sternite strongly spatulate, the apex minutely serrate and hirsute.

Female.—Unknown.

Paratypes.—2 males, as follows:

CALIFORNIA: 1 ♂; Five and one-half miles northwest of Indio, Riverside County; April 9, 1936; (P. H. Timberlake; at flowers of mesquite [*Prosopis chilensis*]); [Timberlake].

ARIZONA: 1 ♂; Phoenix, Maricopa County; April 4, 1897; (R. E. Kunze); [U. S. N. M.].

Distribution.—Like so many of the other species of this genus, *cressoni* is a vernal form. It is primarily a form of the Lower Sonoran zone of the Colorado Desert ranging eastward into south-central Arizona.

Ammoplanops ashmeadi[24] new species (Pl. XVI, fig. 25.)

This species has the general habitus of *cockerelli*, its closest relative, but is separable from that form by the stronger clypeal keel of the males which is free rather than adnate dorsally and ends in the form of a retrorse barb. The females are almost indistinguishable from those of *cockerelli*.

Type.—♂; Palm Springs, Riverside County, California. April 3, 1925. (P. H. Timberlake; on flowers of mesquite [*Prosopis*

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[24] Dedicated to the late William Harris Ashmead.

chilensis]). [Academy of Natural Sciences of Philadelphia, Type no. 4192].

Male.—2.6 mm. long. Black; palpi, mandibles except apices which are testaceous, tegulae anteriorly, axillary sclerites laterally, fore tibiae entirely, middle and hind tibiae annulate at base and apex, all of fore tarsi and first four segments of middle and proximal two articles of hind tarsi, eburneous. Ultimate article of middle and last three segments of hind tarsi, testaceous. Fore femora, tegulae posteriorly, and inner half of axillary sclerites, castaneous. Flagellum brunneous; pedicel and flagellum light brunneous, each segment marked with sordid eburneous beneath. Wings clear hyaline; costa eburneous, stigma and remaining veins sordid badeous.

Head subquadrate in anterior aspect, subfulgid; clypeus and front with conspicuous silvery appressed pubescence; vertex sparsely clothed with very short suberect silvery pubescence. Eyes reaching to bases of mandibles; inner orbits sinuate, subparallel below to slightly divergent above; vertex extending in a low even arch above dorsal margins of compound eyes for about one-sixth their length; ocelli in a low triangle, the median ocellus on a line with the dorsal margins of eyes, ocellocular and postocellar lines subequal. Vertex with transverse close obscure aciculation. Front with fine scattered setigerous acupuncturation; with an indistinct median longitudinal impressed line above from the anterior ocellus; laterally below on each side with an oblique concave scrobe for the reception of the scapes, each scrobe continued downward to dorsal margin of clypeus, tumid between antennal sockets. Antennae situated a little above dorsal margin of clypeus, nearer the corresponding eye margin than to each other; scapes straight, obterete, one-third the length of eye; flagellum finely puberulent, each segment slightly gibbous medially, last article simple, terete, eight-tenths the length of the two preceding segments combined. Clypeus transversely subadamantiform and subtectate, length medially one-half that of eye, strongly tridentate medio-apically, the middle tooth the largest and longest and keeled and rostrate, the keel projecting free dorsad in the form of a retrorse barb, flatly tumid discally above, the median dorsal margin armed with a small porrect tooth. Mandibles sublinear, apex acute, inner margin with a small blunt preapical tooth, lower ventral margin simple, unarmed.

Thorax fulgid; mesonotum, scutellum, postscutellum, prepectus and venter with short sparse decumbent light pubescence. Pronotum situated much below level of mesonotum and narrower than it, without a distinct dorsal surface but gradually declivous from anterior margin of mesonotum to level of neck; lateral faces finely obgranulose, without a horizontal or oblique longitudinal impression; tubercles almost attaining the tegulae. Mesonotum with scattered setigerous acupuncturation, strongly arched and vertically declivous anteriorly to level of pronotum, anterior margin arcuate in dorsal aspect; notauli present and distinct on anterior half; suture between mesonotum and scutellum deeply impressed and consute; scutellum and postscutellum punctured like mesonotum, the latter strongly tumid. Mesopleura rounded anteriorly, without an epicnemium, subnitidous to subobgranulate posteriorly, foveolate along the meso-metapleural suture; metapleura glabrous, subobgranulose. Propodeum glabrous, subfulgid, basically subobgranulate; dorsal face medially with a pair of well separated parallel longitudinal carinulae discally, posterior margin edged by a transverse carinula; lateral faces obgranulate; posterior face with weak transverse rugulae, medially with a cuneate fovea.

Abdomen perfulgid, oval, sessile, not appreciably constricted between the segments; tergites and sternites with an obscure microscopic transverse aciculation and sparsely clothed with short scattered pubescence which is most noticeable on sternites and apical tergites; last tergite triangular, without a pygidial area, with fine well separated acupuncturation, preapically with a shallow inconspicuous transverse arcuate nitidous sulcus, apex acute; sixth sternite glabrous, nitidous, discally with a concave circular depression, posterior margin shallowly sinuate to subtruncate; ultimate sternite fulgid, spatulate, finely punctate, apex serrate and with a fringe of short hair.

Allotype.—♀; Palm Springs, Riverside County, California. April 10, 1932. (P. H. Timberlake; on *Prosopis chilensis* [mesquite]). [Academy of Natural Sciences of Philadelphia].

Female.—2.7 mm. long. Coloration agrees in general with male except apices of mandibles are clear brunneous; pedicel and flagellum light brunneous above, testaceous beneath. Wings with stigma, costa, subcosta and radial veins brunneous, remaining veins testaceous.

Head as in male but front more sparsely punctured; inner orbits gradually divergent above; antennae situated on dorsal margin of clypeus; antennal scrobes of front not as marked. Clypeus transverse, subfusiform, flat to gently tumid discally, length medially one-third that of eyes, produced medially into a short broad truncate lobe, the apical margin of which is flanged. Temples without ammochaetae.

Thorax as in male but notauli are not as distinct. Fore tarsi with a short pecten.

Abdomen as in male but more sparsely pubescent. Last tergite with a trigonal pygidium, one and one-half times as long as broad at base, the lateral margin slightly sinuate, apex narrowly truncate, the disc glabrous, nitidous, gently tumid medially at base, otherwise flat and with a few scattered punctures; sixth and ultimate sternites simple.

Paratype.—1 ♀; Palm Springs, Riverside County, California; April 22, 1929; (P. H. Timberlake; at flowers of mesquite [*Prosopis chilensis*]); [Timberlake].

Distribution.—This vernal form is known at present only from the Salton Trough of the Colorado Desert in southern California where it apparently replaces the closely related, widespread species, *cockerelli.*

Ammoplanops cockerelli (Ashmead)

1903. *Ammoplanus cockerelli* Ashmead, Ent. News, XIV, p. 295. [♀; Las Cruces, New Mexico.]

1937. *Ammoplanops cockerelli* Pate, Trans. Amer. Ent. Soc., LXIII, p. 124, pl. 8, figs. 1, 3, (♀, ♂, head), pl. 9, fig. 15, (fore wing). [NEW MEXICO: Las Cruces; High Rolls; Alamogordo. ARIZONA: Yuma. CALIFORNIA: Needles.]

Type.—♀; Las Cruces, Doña Ana County, New Mexico. September 23. (T. D. A. Cockerell). [United States National Museum, Type no. 6930].

Remarks.—The present species is intermediate in character between the preceding Salton Trough form, *ashmeadi,* and the following northeastern Arizona species, *moenkopi.* The chief differential features for separating the males of *cockerelli* from those forms have been given in the foregoing key to species. Unfortunately, I have been unable to discover any tangible characters for distinguishing the females of this species from those of its closest relatives; at present certain identification can be made only by association with the corresponding males.

Ethology.—The species frequents a variety of flowers and flies from early in April to the middle or latter part of September in New Mexico and southern California, the only regions as yet from which we have reasonably full information. Nothing is known concerning the prey with which the female stores the nest. The data given below indicate that *cockerelli* in all probability has at least two, if not more, generations a year.

Specimens examined: 170; 102 males, 68 females.

COLORADO: 2♂; Forrester's Ranch, Larimer County; August 3, 1896; (C. F. Baker); [U.S.N.M.].

NEW MEXICO: 1♀; eight miles west of Farmington, San Juan County; July 23, 1929; (on *S[alsola] pestifer* [Russian Thistle]); [U.S.N.M.]. 3♀; Laguna, Valencia County; September 4, 1930; (P. H. Timberlake; on *Isocoma wrightii*); [Timberlake]. 1♂; twenty-two miles southwest of Datil, Catron County; August 7, 1929; (on *S[alsola] pestifer* [Russian

Thistle]); [U.S.N.M.]. 4♂; High Rolls,[25] Otero County, Sacramento Mountains; elevation, 7000 feet; May 10 to June 13, 1902; (H. L. Viereck); [A.N.S.P.]. 3♂; Alamogordo,[26] Otero County; elevation, 4320-4600 feet; May 10 and June 6, 1902; (H. L. Viereck); [A.N.S.P.]. 1♀; six miles east of Tularosa, Otero County; August 19, 1929; (on *L[epidium] alyssoides* [Peppergrass]); [U.S.N.M.]. 1♀; Las Cruces, Doña Ana County; September 23; (T. D. A. Cockerell); [*type*, U.S.N.M.]. 5♂; "Misella" [?= Mesilla, Doña Ana County]; (no other data); [U.S.N.M.].

Texas: 3♂; between La Tuna and Vinton, El Paso County; elevation, 3790 feet; August 29, 1937; (Rehn, Pate & Rehn; swept from a white mustard alongside road); [A.N.S.P.]. 1♂; El Paso, El Paso County; May 13; (T. D. A. Cockerell); [U.S.N.M.].

Utah: 3♀, 1♂; Watson, Uintah County; elevation, 5300 feet; June 22; (F. M. Carpenter); [Mus. Comp. Zoöl.].

Arizona: 60♂, 40♀; Sacaton, Pinal County; June 14, 1909; (sweeping pomegranate); [U.S.N.M.]. 1♂; Tucson, Pima County; March 24, 1896; (R. M. Kunze; sweeping grasses, sedges, etc.); [U.S.N.M.].

California: 2♂, 4♀; Whittier, Los Angeles County; August 11, 1920; (P. H. Timberlake; on anise flowers); [Timberlake; and U.S.N.M.]. 1♂, 3♀; Hodge, San Bernardino County; September 14, 1935; (P. H. Timberlake; on *Cleomella obtusifolia* [Stinkweed]); [Timberlake]. 1♂, Barstow, San Bernardino County; September 12, 1924; (P. H. Timberlake; on *Cleomella obtusifolia* [Stinkweed]); [Timberlake]. 2♀; Cronise, San Bernardino County; July 8, 1938; (P. H. Timberlake; on *Heliotropium Curassavicum*); [Timberlake]. 2♀, 10♂; Needles, San Bernardino County; April 1-6, 1918; (J. C. Bradley; on mesquite [*Prosopis chilensis*]); [Cornell]. 1♂, 1♀; Hemet, Riverside County; September 27, 1937; (L. D. Christenson; on peach); [U.S.N.M.]. 1♀; Imperial County; May, 1911; (J. C. Bridwell); [U.S.N.M.]. 5♂; Yuma Indian Reservation[27] (across Colorado River from Yuma, Arizona), Imperial County; May 5, 1918; (J. C. Bradley; swept from flowers of composite along bank of river at end of railroad bridge); [Cornell].

Distribution.—The present species is widespread throughout the Lower and Upper Sonoran zones of the southwestern United States. The range of *cockerelli* extends from the Trans-Pecos Highlands of western Texas and the Sacramento Range of south-central New Mexico across the continental divide through the Datil area of west-central New Mexico over the southern Arizona highlands into the eastern margin of southern California's Colorado Desert which it skirts, running northwest into Los Angeles County to the base of the San Gabriel Mountains. Ranging through the southern foothills of the San Bernardino Range, it passes eastward and crosses this, probably in the neighbourhood of the San Gorgonio Pass, into the Mohave Desert where it is widespread. In the Colorado Desert it is largely replaced by the closely related Salton Trough form, *ashmeadi*. The northern limits of the distribution of *cockerelli*, so far as known at present, extend over the Coconino Plateau of Arizona, through the canyon lands and lower plateau regions of northern Arizona and southern Utah and reach as far as the Uintah Basin of northeastern Utah and the eastern foothills of the Southern Rocky Mountains in north-central Colorado. The only region of the Colorado Plateaus from which *cockerelli* is apparently absent is the Moenkopi uplift where its place is taken by the closely related species, *moenkopi*.

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[25] The remarks on a following page in footnote 36 under *Pulverro mescalero* will apply equally well here.

[26] *Cf.* the statement on a following page in footnote 37 under *Pulverro mescalero*.

[27] Due to ambiguous label, incorrectly reported previously as Yuma, Arizona [*cf.* Trans. Amer. Ent. Soc., LXIII, p. 124, (1937)].

Ammoplanops moenkopi[28] new species

The present species has the superficial habitus of *cockerelli* but is distinguished from that form by the tuberculate sixth abdominal sternite, the vertically keeled lower anterior angle of the pronotum and the minute tooth on the median dorsal margin of the clypeus. In addition, the three medio-apical clypeal teeth are larger and more distinct than in *cockerelli* with the median one not as strongly keeled as in that species while the dorsal margin of the clypeus is evenly arcuate in *moenkopi* in sharp contrast to the rather obtusely angulate condition found in *cockerelli*. Finally, the inner preapical mandibular tooth of the present form is larger and more pronounced than in the latter species.

Type.—♂; Eleven miles east of Moenkopi on the road to Hotevilla, Coconino County, Arizona. Elevation, 5200 feet. July 27, 1937. (Rehn, Pate & Reḥn; swept from flowers of *Cleome serrulata* [Rocky Mountain Bee-plant] alongside road). [Academy of Natural Sciences of Philadelphia, Type no. 4206].

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[28] After Moënkopi or "Place of Running Water", a Hopi site in northeastern Arizona.

Male.—2.5 mm. long. Black; mandibles except apices which are fulvous, palpi, all tarsi, tegulae with a large spot anteriorly, eburneous; fore femora at apex, fore tibiae entirely, middle and hind tibiae broadly annulate at base and narrowly at apex, stramineous; axillary sclerites fuscous. Wings lacteopellucid; stigma, costa, subcosta and marginal vein fuscous; remaining venation luteous.

Head subquadrate in anterior aspect, subfulgid; clypeus and lower part of front with conspicuous silvery appressed pubescence, remainder of front and vertex more sparsely clothed with very short suberect silvery puberulent pile. Eyes reach to bases of mandibles, inner orbits sinuate, subparallel; vertex extending in a low even arch above dorsal margins of compound eyes for about one-fifth their length; ocelli in a low triangle, median ocellus on a line with the dorsal margins of the eyes, ocellocular and postocellar line subequal; front slightly concave between orbits above antennal insertions; front and vertex with fine microscopic reticulate aciculations. Antennae situated above dorsal margin of clypeus about one-fourth the length of eyes above their ventral margins, about as far from each other as from nearest eye margin; scapes one-fourth the length of eyes, straight, slightly incrassate distad; flagellum finely puberulent, last article simple, terete, subequal in length to the two preceding ones combined. Clypeus transversely subadamantiform and subtectate, length medially about one-fourth the length of eyes, strongly tridentate medioapically, the middle tooth the largest and keeled and rostrate; discally above concave, the median dorsal margin armed with a minute tooth. Mandibles sublinear, apex acute, inner margin with a large blunt preapical tooth, the outer margin of which is somewhat dilated; lower margin simple, edentate.

Thorax fulgid; dorsally and ventrally with fine short sparse decumbent pubescence, pleura and propodeum glabrous. Pronotum situated much below level of mesonotum, without a distinct dorsal surface but gradually declivous from anterior margin of mesonotum to neck, subopaque and finely granulose, discally with a small median longitudinal fovea; lower anterior angles of lateral faces with a short vertical keel or flange; tubercles almost attaining the tegulae. Mesonotum with fine well separated acupuncturation, strongly arched and vertically declivous anteriorly to level of pronotum, anterior margin arcuate in dorsal aspect; notauli evident on anterior fourth; suture between mesonotum and scutellum impressed and consute; scutellum and postscutellum punctured like mesonotum. Mesopleura rounded anteriorly, without an epicnemium; cephalad of the subconsute episternal suture punctured like mesonotum, remainder subnitidous; metapleura opaque, finely granulose. Propodeum subopaque; dorsal face finely granulose, medially with an elongate rectangular enclosure delimited by two parallel longitudinal carinulae, laterad of which the surface is obscurely, irregularly, clathrately rugulose; lateral faces opaque, finely granulose; posterior face medially with a cuneiform areole laterad of which the surface is transversely striatogranulose.

Abdomen fulgid to nitidous, oval, sessile, constricted somewhat between the segments; tergites and sternites with an obscure microscopic transverse aciculation and sparsely clothed with short scattered pubescence which is most noticeable on sternites and apical tergites; last tergite triangular, without a pygidial area, with fine well separated acupuncturation, strongly gibbous anteriorly, transversely flattened apically, the apex acute; second sternite with a transverse sulcus basally; sixth sternite glabrous, nitidous, transversely concave discally, the posterior margin broadly and deeply excised and provided medially with a distinct tubercle; last sternite opaque, finely punctate, short, broad, spatulate, the apex serrate and with a fringe of long curved hairs.

Female.—Unknown.

Paratypes.—3 males, as follows:

ARIZONA: 2 ♂ ; Eleven miles east of Moenkopi on road to Hotevilla, Coconino County; elevation, 5200 feet; July 27, 1937; (Rehn, Pate & Rehn; swept from flowers of *Cleome serrulata* [Rocky Mountain Bee-plant] alongside road). 1 ♂ ; Twin Buttes near Indian Wells, Navajo County; elevation, 5850 feet; July 29, 1937; (Rehn, Pate & Rehn; swept from flowers of *Cleome serrulata* in swale). [All Academy of Natural Sciences of Philadelphia.]

Distribution.—This interesting little species is apparently confined to the Upper Sonoran zone of the Moenkopi Plateau in northeastern Arizona, replacing there the closely related, widespread preceding form, *cockerelli.*

Ammoplanops timberlakei[29] new species
(Pl. XV, fig. 11; pl. XVI, figs. 20, 23.)

This and the following two species form a distinct group, the diagnostic characters of which have been given on a preceding page. This vernal eremian form from southern California is readily separable from its close relative *vierecki* from the Lower Sonoran region of New Mexico by the structure of the clypeus, the sixth sternite and the hypopygium as pointed out in the foregoing key to species. In addition, the mandibles are much less bowed basally and the outer margin of the first preapical tooth on the inner margin is scarcely dilated in the present species in sharp contrast to the conformation of the mandibles of *vierecki.*

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[29] Named for its collector, Dr. P. H. Timberlake of Riverside, California, who secured the types of this interesting form, as well as many of the other species described or reported in this paper.

Furthermore, the abdomen of *timberlakei* is not as strongly constricted between the segments as that of its New Mexican congener.

Type.— ♂ ; Andreas Canyon,[30] Palm Springs, Riverside County, California. April 24, 1932. (P. H. Timberlake; on *Eriogonum fasciculatum* var. *polifolium* [California Buckwheat]). (Academy of Natural Sciences of Philadelphia, Type no. 4201].

Male.—2.75 mm. long. Black; mandibles except the apices which are fulvous, labrum, palpi, fore femora apically, fore tibiae entirely, middle and hind tibiae broadly annulate at knee, and all tarsi, eburneous. Scape, pedicel and first two flagellar articles, brunneous; last few flagellar segments fulvescent; tegulae and axillary sclerites, testaceous. Wings clear hyaline, iridescent; stigma, costa, subcosta and marginal veins fuliginous; remaining venation brunneous.

Head subquadrate in anterior aspect, fulgid; clypeus (except for disc) and lower part of front with short, appressed silvery pubescence, remainder of front and vertex more sparsely clothed with short suberect silvery puberulent pile. Eyes reaching to bases of mandibles below, inner orbits repand, converging slightly below; vertex extending in a low even arch above dorsal margins of compound eyes for about one-sixth their length; ocelli in a low triangle, median ocellus on a line with dorsal margins of eyes; front broadly and shallowly concave between the orbits and with fine well separated acupuncturation. Antennae situated low, a little above the dorsal margin of the clypeus, scapes a little more than one-third the length of eyes, straight, slightly incrassate distad, flagellum finely puberulent, last article simple, terete, subequal in length to the two preceding ones combined. Clypeus flat, sublunate, raised discally into a glabrous nitidous subtriangular platform, the apical margin of which is repand and the dorsal margin simple and unarmed. Labrum transverse linear, the apical margin provided with stiff, short setulae. Mandibles broader than usual for genus, apex simple and acuminate, the inner margin just before apex with a broad, blunt round tooth and immediately behind this another smaller blunt tooth, basally with a low obtuse dentoid process; outer margin medially with a low blunt subquadrate tooth projecting at right angles to the lower margin.

Thorax fulgid to subopaque; dorsally and ventrally with fine short, sparse decumbent pubescence, pleura relatively glabrous. Pronotum situated much below the level of the mesonotum, without a distinct dorsal surface but gradually declivous from anterior margin of mesonotum to neck; tubercles almost attaining the tegulae. Mesonotum with fine sparse acupuncturation, strongly arched and vertically declivous anteriorly to level of pronotum, anterior margin evenly arcuate in dorsal aspect; notauli evident on anterior fourth; suture between mesonotum and scutellum impressed and consute; scutellum and postscutellum punctured like mesonotum. Mesopleura rounded anteriorly, without an epicnemium; cephalad of the subconsute episternal suture punctured like mesonotum, remainder subnitidous, the episternaulus weak. Metapleura and lateral faces of propodeum glabrous, subfulgid and microscopically granulose; dorsal surface of propodeum fulgid, granulose, medially with a broad, elongate rectangular enclosure to posterior margin, enclosed by two longitudinal parallel carinulae, caudal edge margined by a transverse carinula; posterior face fulgid, microscopically subgranulose, medially with a cuneiform foveate areole.

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[30] Andreas Canyon is a side canyon of Palm Canyon, about five miles south of Palm Springs. [*Cf.* U. S. Geol. Surv. Water-Supply Pap. 490-A, p. 77 & pl. 6, (1920).]

Abdomen oval, sessile, depressed, fulgid, constricted somewhat between the segments; tergites and sternites transversely microaciculate to microscopically reticulate and sparsely clothed with short scattered pubescence which is more noticeable on sternites and apical tergites; pygidium absent; second to fifth sternites with a transverse, arcuate sulcus basally; sixth sternite glabrous, nitidous, strongly concave discally, posterior margin broadly and arcuately excised; last sternite very narrow, elongate, linguiform and somewhat incrassate distad with the apex truncate and cuspidate medio-apically, the ventral surface finely channeled by a median longitudinal furrow.

Female.—Unknown.

Paratype.—♂; topotypical, same data as type; [Timberlake].

The present distinctive form is known only from the two specimens recorded above.

Distribution.—Like *cressoni* of the Moenkopi Group, *timberlakei* is a vernal form of the Lower Sonoran zone of the Colorado Desert and will in all probability be found rather widely spread throughout the Salton Trough and adjacent areas of southern California.

Ammoplanops vierecki[31] new species

(Pl. XV, fig. 10; pl. XVI, figs. 19, 22.)

This Lower Sonoran species from New Mexico, while closely related to the preceding Californian form, is nevertheless easily distinguished from it, at least in the male sex, by congeries of characters. The chief differential features of the present form have already been presented in the key to species on a preceding

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[31] Dedicated to its collector, the late Henry Lorenz Viereck.

page. In addition, *vierecki* has the mandibles more strongly bowed basally and the lateral margin of the first preapical mandibular tooth more strongly dilated than in *timberlakei*; furthermore, in *vierecki* the abdomen is more noticeably constricted between the segments than in the preceding Californian form.

Type.—♂; Alamogordo,[32] Otero County, New Mexico. Elevation, 4320-4600 feet. April 26, 1902. (Henry L. Viereck). [Academy of Natural Sciences of Philadelphia, Type no. 4205].

Male.—2.5 mm. long. Black; mandibles except apices which are rufous, palpi, fore tibiae, all tarsi entirely, middle tibiae broadly at base and apex, hind tibiae at base, yellow; tegulae, axillary sclerites, middle tibiae medially, fuscous; clypeal disc dark castaneous. Wings clear hyaline, iridescent; stigma and costa brunneous, remaining veins light fulvous.

Head subquadrate in anterior aspect, subfulgid; clypeus (except for disc) and lower part of front with short appressed silvery pubescence, remainder of front and vertex more sparsely clothed with very short suberect light puberulent pile. Front with fine separated acupuncturation, discally just above apices of scapes with a short median longitudinal impression. Eyes reaching to bases of mandibles below, inner orbits repand, converging slightly below; vertex extending in a low even arch above dorsal margins of compound eyes for about one-eighth their length; ocelli in a low triangle, ocellocular and postocellar lines subequal, median ocellus on a line with dorsal margins of eyes; front broadly and shallowly concave between the orbits. Antennae situated low on face a little above dorsal margin of clypeus, a little nearer each other than the nearest eye margin; scapes about one-fourth the length of eyes, straight, slightly incrassate distad; flagellum finely puberulent, last article simple, terete, subequal in length to the two preceding articles combined. Clypeus flat, sublunate, raised discally into a glabrous nitidous subquadrate platform which is longer than broad and the dorsal margin of which is evenly arched in outline and bears medially a porrect spine, apical margin of platform truncate. Labrum short, transverse, linear, the apical margin provided with short stiff setulae. Mandibles broader than usual for genus, apex simple and acuminate, inner margin provided with an acute preapical tooth immediately basad of which the margin is strongly and arcuately dilated, proximad of dilation is another smaller acute tooth; lower margin with a large subtrigonal tooth projecting at right angles to the outer margin; mandibles somewhat constricted basally and rather strongly bowed there.

Thorax fulgid to subopaque; dorsally and ventrally with fine short, sparse decumbent pubescence, pleura relatively glabrous. Pronotum situated much below the level of the mesonotum, without a distinct dorsal surface but gradually declivous from anterior margin of mesonotum to neck; tubercles almost attaining the tegulae. Mesonotum with fine sparse acupuncturation, strongly arched and vertically declivous anteriorly to level of pronotum, anterior margin evenly arcuate in dorsal aspect; notauli evident on anterior fourth; suture between mesonotum and scutellum impressed and consute; scutellum and postscutellum punctured like mesonotum. Mesopleura rounded anteriorly, without an epicnemium, cephalad of the subconsute episternal suture punctured like mesonotum, remainder subnitidous, the episternaulus weak; metapleura glabrous, subfulgid and microscopically granulose. Propodeum fulgid to subopaque; dorsal face with a median subrectangular enclosure defined by two subparalled longitudinal carinulae and crossed by several irregular transverse rugulae, laterad of enclosure the surface irregularly and sparsely rugulose; lateral faces weakly and irregularly areolate on a subgranulose surface; posterior face subnitidous, with a median longitudinal furrow, laterally finely puberulent.

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[32] *Cf.* Proc. Acad. Nat. Sci. Phila., LV, p. 16, (1903); *v. et.*: Proc. Acad. Nat. Sci. Phila., LXI, p. 112, (1909).

Abdominal oval, sessile, depressed, fulgid, rather strongly constricted between the segments; tergites and sternites transversely micro-aciculate to microscopically reticulate and sparsely clothed with short scattered pubescence which is more noticeable on sternites and apical tergites; pygidium absent; second to fifth sternites with a transverse arcuate sulcus basally; sixth sternite punctate, slightly concave discally, latero-medially on each side with a small indistinct tubercle, the posterior margin broadly and angularly emarginate; last sternite elongate, linguiform and somewhat incrassate distad with the apex truncate and cuspidate medio-apically, the ventral surface not channelled but moderately convex and with a low inconspicuous median longitudinal keel; posterior margin of sixth and base and apex of last sternite sparsely hirsute.

Allotype.— ♀ ; Topotypical, same data as type. [Academy of Natural Sciences of Philadelphia].

Female.—2.5 mm. long. Similar to male except as follows. Black; clypeus, labrum, palpi, mandibles except apices which are rufous, antennae, fore tibiae, all tarsi, fore, middle and hind femora at apex, middle and hind tibiae at base and apex, yellow; fore trochanters and femora, castaneous; middle and hind femora and tibiae and axillary sclerites, brunneous. Wings clear hyaline, iridescent; stigma brunneous, veins fulvous.

Head with the clypeus transverse, subfusiform, flat, tumid discally, edentate above, medio-apically with a short broad flange. Mandibles simple, normal, without the projecting tooth on lower ventral margin as in male.

Thorax as in male but dorsal face of propodeum more delicately sculptured.

Abdomen without constriction between the segments; sternites without basal grooves; last tergite with an elongate triangular pygidium, about twice as long as broad at base, the lateral margins straight not bowed, the disc fulgid, very inconspicuously keeled medio-longitudinally, laterally with a few fine setigerous punctures.

Paratypes.—3 ♂, 1 ♀; topotypical, same data as type; [Academy of Natural Sciences of Philadelphia].

Distribution.—The present species is a vernal form and probably occurs throughout the Lower Sonoran zone of southern New Mexico east of the continental divide.

Ammoplanops foxi[33] new species

(Pl. XV, fig. 12; pl. XVI, figs. 17, 18.)

The present montane form of the Mohave Desert is most closely allied to the preceding southern New Mexican species with which it agrees in the spined clypeus and the linguiform non-canaliculate hypopygium. From *vierecki*, however, *foxi* is distinguished by the three rather than two subparallel carinulae medially on the dorsal face of the propodeum, by the broad campanulate clypeal platform—superficially resembling *timberlakei* of the Colorado Desert in this respect—and the more strongly bowed mandibles of which the first preapical tooth is much more strongly dilated while the projecting tooth of the lower ventral margin is lower and broader. Furthermore, in the present species the sixth abdominal sternite is strongly concave discally with a strong arcuate sulcus posteriorly while latero-medially on each side along the anterior margin of the sulcus is a distinct transverse sharp and strongly compressed elongate tubercle; in *vierecki* the disc is only moderately concave, there is no arcuate sulcus posteriorly and the lateral tubercles are small and indistinct.

Type.—♂; Clark Mountain,[34] San Bernardino County, California. Elevation, 6000 feet. July 8, 1938. (P. H. Timberlake; on *Solidago Petradoria*). [Academy of Natural Sciences of Philadelphia, Type no. 4191].

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[33] Dedicated to William J. Fox, Librarian of the Academy of Natural Sciences of Philadelphia, whose work has done so much to advance our knowledge of the Aculeate Hymenoptera of the Americas.

[34] Not to be confused with Clark Mountain in the Yosemite National Park, Mariposa County, California. The present Clark Mountain, some 7000 feet high, is situated in the Upper Kingston Valley in the northeastern part of San Bernardino County and lies about midway between the Kingston Range on the north and the Ivanpah Mountains to the south. [*Cf.* U. S. Geol. Surv. Water-Supply Pap., no. 578, pp. 599-604, pl. 12, (1929); *v. et.*, U. S. Geol. Surv. Water-Supply Pap., no. 224, map, pl. 1, (1909).]

Male.—2.5 mm. long. Black; mandibles and palpi eburneostramineous, apices of former testaceous; labrum sordid eburneous; fore femora at apices, fore tibiae entirely, middle and hind tibiae broadly annulate at base, fore tarsi entirely and metatarsi of middle and hind tarsi, luteous; remainder of middle and hind tarsi sordid testaceous; tegulae and axillary sclerites brunneous. Wings iridescent, clear hyaline; stigma and veins brunneous.

Head subquadrate in anterior aspect, subfulgid; clypeus (except for disc) and lower part of front with short appressed silvery pubescence, remainder of front and vertex sparsely clothed with very short suberect aeneous puberulent pile. Front with a very fine microscopic reticulate sculpture. Eyes reaching bases of mandibles below, inner orbits subparallel, slightly sinuate; vertex extending in a low even arch above dorsal margins of compound eyes for about one-fifth their length; ocelli in a low triangle, the ocellocular and postocellar lines subequal, median ocellus situated about on a line with the dorsal margin of eyes; front flat save for the concave antennal scrobes and a very inconspicuous low keel medially below between antennal insertions. Antennae situated low on face along dorsal margin of clypeus, a little nearer each other than nearest eye margin; scapes three-tenths the length of eyes, straight, obterete; pedicel subcylindrical, elongate; flagellum finely puberulent, last article simple, terete, subequal in length to the two preceding segments combined. Clypeus flat, sublunate, raised discally into a glabrous nitidous subcampanulate platform which is slightly broader than high and is armed medially on dorsal margin with a small porrect spine, platform with apical margin broadly and shallowly repand, the disc inconspicuously and shallowly concave. Labrum short, transverse, linear-sublunate, the apical margin provided with short stiff setulae. Mandibles broad for genus, apex simple, acuminate, inner margin provided with a broad blunt obtuse preapical tooth immediately basad of which the margin is very strongly and arcuately dilated, proximad of dilation is another smaller acute tooth; lower ventral margin with a low elongate subsemicircular tooth projecting medially; mandibles strongly bowed basally.

Thorax fulgid; dorsally with light aeneous, and ventrally with silvery short sparse decumbent pubescence; pleura relatively glabrous. Pronotum situated much below level of mesonotum, without a distinct dorsal surface but gradually declivous from another margin of mesonotum to neck, the lateral surfaces subobgranulate; tubercles almost attaining tegulae. Mesonotum with fine sparse setigerous acupuncturation, anteriorly strongly arched and vertically declivous to level of pronotum, anterior margin broadly subquadrately rounded in dorsal aspect; notauli very distinct on anterior fourth; scutellum flat, punctured like mesonotum but more sparsely so, anteriorly with a narrow transverse impressed consute groove; postscutellum punctured like scutellum, suture between scutellum and postscutellum not appreciably impressed nor consute. Mesopleura rounded anteriorly, without an epicnemium, cephalad of the strongly impressed non-consute episternal suture finely and inconspicuously clathrately aciculate, remainder subnitidous, episternaulus weak; metapleura glabrous, subfulgid, finely obgranulate. Propodeum glabrous, subfulgid to subopaque, obgranulate; dorsal face medially with three parallel longitudinal carinulae, laterad of these the surface is finely rugulose and with a few fine oblique carinulae, posterior margin edged by a sharp transverse carinula; lateral faces with very fine reticulate obgranulate sculpture becoming coarser along dorsal and posterior edges; posterior face obgranulate laterally and ventrally, passing to subnitidous discally, medially with an elongate lyriform fovea.

Abdomen elongate oval, sessile, fulgid, strongly contricted between the segments; tergites and sternites transversely microaciculate to microscopically reticulate and sparsely clothed with short suberect pubescence which is most noticeable on sternites and apical tergites; no pygidium; second to fifth sternites with an arcuate sulcus basally; sixth sternite punctured, strongly concave discally, posteriorly with an arcuate sulcus and latero-medially on each side along anterior margin of sulcus with a distinct transverse elongate sharp and strongly compressed tubercle, the caudal margin broadly and angularly emarginate; last sternite elongate linguiform and slightly incrassate at apex which is truncate and cuspidate medio-apically, the ventral surface not channelled but moderately convex; sixth sternite and ventral surface and apex of hypopygium hirsute.

Female.—Unknown.

This interesting and distinctive little species is known only from the unique male.

PULVERRO Pate

1937. *Pulverro* Pate, Trans. Amer. Ent. Soc., LXIII, p. 107.

Since I described this genus in 1937, I have had an opportunity to study much additional material of it. These new records which considerably amplify our knowledge of the distribution and range of the various species, together with the descriptions of the females of *serrano* and *chumashano*—hitherto known only from the male sex—, will be found on the following pages.

Pulverro mescalero Pate

1897. *Ammoplanus* sp. Cockerell, Ann. & Mag. Nat. Hist., (6), XIX, p. 402. [Santa Fé, New Mexico.]

1898. *Ammoplanus mandibularis* Ashmead MS [in Cockerell], Proc. Davenport Acad. Nat. Sci., VII, p. 148. [Santa Fé, New Mexico.] (Nomen nudum.)

1937. *Pulverro mescalero* Pate, Trans. Amer. Ent. Soc., LXIII, p. 111, pl. 8, figs. 11, 12 (♂, ♀, head), pl. 9, figs. 16, 18 (wings, thorax). [NEW MEXICO: High Rolls; Alamogordo.]

1937. *Ammoplanus mandibularis* Pate, Trans. Amer. Ent. Soc., LXIII, p. 124. (Not *Ammoplanus mandibularis* Cameron, 1903.)

Remarks.—In 1937 I called attention to Ashmead's manuscript name *Ammoplanus mandibularis* which Cockerell mentioned in 1897 and 1898 and suggested that it might be the species which Ashmead later in 1903 described as *Ammoplanus cockerelli* [= *Ammoplanops cockerelli* (Ashmead)]. Recently while at the United States National Museum I discovered a unique male of *Pulverro mescalero* from Santa Fé, New Mexico, which bore in Ashmead's handwriting the label "*Ammoplanus mandibularis* Ashmead MS". This in all probability is the specimen to which Cockerell referred and which Ashmead intended to utilize as the type of his species. However, *mandibularis* Ashmead is a nomen nudum and will not invalidate the present name of this species. Moreover, Cameron in 1903 employed the same specific name *mandibularis* for a South African species of true *Ammoplanus*.

The following material of this species is now before me.

Specimens examined: 105; 80 males, 24 females.

NEW MEXICO:[35] 1♂; Santa Fé, Santa Fé County; (T. D. A. Cockerell); [U.S.N.M.]. 1♀; thirteen miles south of Madrid, Santa Fé County; July 19, 1929; (on *Croton texensis*); [U.S.N.M.]. 48♂, 11♀; High Rolls,[36] Sacramento Mountains, Otero County; elevation, 7000 feet; April 26 to July 12, 1902; (H. L. Viereck); [A.N.S.P., including *type, allotype* and *paratypes*]. 29♂, 13♀; Alamogordo,[37] Otero County; elevation, 4320-4600 feet; May 10 to June 13, 1902; (H. L. Viereck); [A.N.S.P., including *paratypes*].

ARIZONA: 2♂; Tusuyan, Coconino County; elevation, 6600 feet; July 25, 1937; (Rehn, Pate & Rehn; swept from *Cleome serrulata* [Rocky Mountain Bee-plant]); [A.N.S.P.]. 1♂; Oak Creek [Canyon, Coconino County?]; July 13, 1937; (L. D. Christenson; on peach); [U.S.N.M.].

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[35] In addition to the material reported here I took specimens of a *Pulverro* which probably were *mescalero* at the flowers of thistle on July 21, 1937, at Red Hill, twenty-five miles west of Quemado, Catron County, New Mexico, at an elevation of 7560 feet. This locality is just a little west of the Datil country and a short distance east of the Arizona line.

[36] According to Stone and Rehn [Proc. Acad. Nat. Sci. Phila., LV, p. 18, (1903)], High Rolls ". . . is situated near the lower border of the Transition zone, and possesses few types in common with Alamogordo but shares quite a few with Cloudcroft . . . [which at an elevation of 9000 feet] . . . is situated in heavy Canadian forests. The fauna and flora of Cloudcroft are pure Canadian . . ." From this we may conclude that *Pulverro mescalero* is reaching the highest point of its altitudinal range at High Rolls. [*V. et.*: Proc. Acad. Nat. Sci. Phila., LXI, p. 112, (1909).]

[37] Stone and Rehn state [Proc. Acad. Nat. Sci. Phila., LV, p. 17, (1903)] that Alamogordo ". . . appears to be truly Lower Sonoran . . ." [*V. et.*: Proc. Acad. Nat. Sci. Phila., LXI, p. 112, (1909).]

Distribution.—This, the genotypic species of *Pulverro*, is a late vernal and aestival form of the Lower and Upper Sonoran zones of the southern intermontane and plateau regions. Its range extends from the Sacramento Mountains and upper Rio Grande valley area of central New Mexico through the Datil section of west-central New Mexico into the Arizona highlands and reaches as far as the northern section of the Coconino Plateau.

Pulverro columbianus (Kohl)

1890. *Ammoplanus (?) columbianus* Kohl, Ann. K. K. Naturhist. Hofmus., Wien, v, p. 61, text-fig., (fore wing). [♀; Lytton, British Columbia, Canada.]

1909. *Ammoplanus eriogoni* Rohwer, Trans. Amer. Ent. Soc., XXXV, p. 101. [♂; Florissant, Colorado; at flowers of *Eriogonum umbellatum*.]

1937. *Pulverro columbianus* Pate, Trans. Amer. Ent. Soc., LXIII, p. 113, pl. 8, fig. 4, (♂, head). [♂; North Fork of Duchesne River, Utah.]

Since publication of my 1937 paper, I have seen the following material of this species.

BRITISH COLUMBIA: 2♂; Kaslo; 1903; (R. P. Currie); [U.S.N.M.]. 1♂; Ainsworth; July 10-11, 1903; (R. P. Currie); [U.S.N.M.].

OREGON: 1♂; Grande Ronde River north of Imbler, Union County; July 19, 1936; (George R. Ferguson); [Ferguson].

IDAHO: 1♂; Moscow, Latah County; July 17, 1924; (J. M. Aldrich); [U.S.N.M.].

UTAH: 1♂; "Kaibab Plateau"[38]; June 29, 1930; (W. H. Thorpe); [Timberlake].

COLORADO: 3♂; Four Mile Hill, eight miles south of Steamboat Springs, Routt County; July 21, 1896; (Charles Liebeck); [U.S.N.M.]. 1♂; Forrester's Ranch, Larimer County; August 3, 1896; (C. F. Baker); [U.S.N.M.].

Distribution.—Like *colorado*, the present species is a middle to late aestival form of the northern intermontane and plateau regions of the west. Its range is essentially the same as that of *colorado*.

Pulverro serrano Pate (Pl. XV, fig. 6.)

1937. *Pulverro serrano* Pate, Trans. Amer. Ent. Soc., LXIII, p. 114, pl. 8, fig. 9 (head). [♂; Altadena, Los Angeles County, California.]

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[38] The Kaibab Plateau is in northern Arizona and does not extend into Utah. Possibly the plateau region around the town of Kanab (the Kanab Plateau is in northern Arizona, east of the Kaibab) or the Kolob Plateau, both regions in southwestern Utah, is where this specimen came from.

The present species has been known hiterto only from the unique male. There is now before me a series from southern California, taken by Dr. Timberlake; in it is a female which is described below.

The female sex of *serrano* superficially resembles that of *colorado* and *costano* but is separable from both by congeries of characters. The discal platform of the clypeus of the present species is subcampanuliform and distinctly pubescent while the medio-apical margin is flanged, whereas in *costano* and *colorado* the clypeus is glabrous and nitidous discally and the medio-apical margin is merely beaded; moreover, the two latter species lack the low keel medially on the front between the antennal sockets which is present in *serrano*. Finally, both the 'notauli and parapsidal furrows are strongly indicated on the anterior portion of the mesonotum in *serrano*; in the two other species only the notauli are evident.

Allotype.—♀; Riverside, Riverside County, California. September 26, 1937. (P. H. Timberlake; on *Solidago occidentalis*). [Academy of Natural Sciences of Philadelphia].

Female.—3 mm. long. Black; mandibles eburneous, apices deep rufous; clypeus fulvous medio-apically; scapes brunneous; pedicel and flagellum sordid luteous; tibiae, tarsi, tegulae and axillary sclerites sordid fulvous. Wings clear hyaline; stigma brunneous, veins badeous.

Head fulgid; front and vertex with a very fine sparse and inconspicuous subaeneous puberulent pubescence; clypeus (including the disc) well clothed with fine appressed silvery pubescence. Eyes truncate below, reaching bases of mandibles, inner orbits arcuate, subparallel above to somewhat convergent below; vertex and front with fine scattered acupuncturation becoming longitudinally subaciculate on latter below. Antennae situated as in male, short, only reaching about as far as occiput; scape straight, about one-third length of eyes; pedicel cylindrical, subequal in length to first two flagellar segments; flagellum finely puberulent, subclavate apically, last article simple, elongate, terete, subequal in length to two preceding segments combined. Clypeus transverse, subfusiform, medially about three-eighths as long as eye; with a weakly produced truncate lobe medially, the apical margin of which is weakly flanged and provided with a row of moderately long and slender ammochaetae; lateral lobes flat; discally indistinctly raised into a flat subcampanulate platform which is pubescent, not glabrous and nitidous. Front with the lower median portion tumid but without the accessory elevation of the male; with a low weak median longitudinal keel below for about one-third the length, laterad of keel shallowly concave and discally above with a short indistinct median longitudinal impression. Mandibles as in male. Temples subnitidous, glabrous, without temporal ammochaetae.

Thorax fulgid; mesonotum, scutellum, postscutellum and prepectus with fine short sparse decumbent subaeneous puberulent pubescence; pleura relatively glabrous. Pronotum narrow, linear, transverse, situated much below level of mesonotum and narrower than it; tubercles almost attaining the tegulae. Mesonotum sparsely and minutely acupunctate, thrust forward over the pronotum, in dorsal aspect not as strongly biangulate as in male; both notauli and parapsidal furrows very distinct on anterior fourth; suture between mesonotum and scutellum impressed and consute; scutellum and postscutellum punctured like mesonotum, the latter more sparsely so. Mesopleura with prepectus very sparsely and minutely acupunctate, below wing bases obscurely longitudinally striate, otherwise nitidous; metapleura finely granulate. Propodeum fulgid, glabrous, finely granulate; dorsal face medially with two subparallel widely separated longitudinal carinulae with a longitudinal one interposed medially between the two on the posterior half, caudal margin edged by a transverse carinula, the lateral edges indistinctly areolated by a few weak carinulae; posterior face with a shallow cuneate fovea medially above. Legs as in male but fore tarsi have a weak pecten.

Abdomen nitidous, with indistinct transverse aciculation; not constricted between the segments; first two segments glabrous save for a transverse row of short declivent setulae subapically; remaining tergites and sternites sparsely pubescent; last tergite with a trigonal pygidium, one and three-fourths as long as broad at base, the lateral margins weakly and concavely arcuate, apex subtruncate to broadly rounded, disc flat, glabrous, nitidous with a few scattered punctures laterally on each side.

Distribution.—The present species is apparently rather generally distributed throughout the Colorado Desert of southern California, ranging northward to the foot of the San Gabriel and San Bernardino Mountains. So far as the present records indicate it does not invade the higher and more northern Mohave Desert region.

Specimens examined: 10; 9 males, 1 female.

CALIFORNIA: 1♂; Altadena, Los Angeles County; August 25, 1907; (James A. G. Rehn); [*type*, A.N.S.P.]. 2♂; Puente Hills,[39] Los Angeles County; May 10, 1926; (P. H. Timberlake; on *Eriogonum fasciculatum* [California Buckwheat]); [Timberlake]. 1♂; Puente Hills,[39] Los Angeles County; May 8, 1927; (P. H. Timberlake; on *Encelia californica*); [Timberlake]. 1♀; Riverside, Riverside County; September 26, 1937; (P. H. Timberlake; on *Solidago occidentalis*); [*allotype*, A.N.S.P.]. 1♂;

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[39] The Puente Hills are situated between Pomona and Whittier, south of the San Jose Hills.

Riverside; September 20, 1932; (P. H. Timberlake; on *Eriogonum gracile*); [Timberlake]. 1♂; Palm Canyon, Riverside County; April 4, 1935; (P. H. Timberlake; at flowers of mesquite [*Prosopis chilensis*]); [Timberlake]. 3♂; Andreas Canyon,[40] Palm Springs, Riverside County; April 24, 1932; (P. H. Timberlake; on *Eriogonum fasciculatum* var. *polifolium* [California Buckwheat]); [Timberlake].

Judging from the above data, *serrano* has at least two if not more generations a year.

Pulverro colorado Pate

1937. *Pulverro colorado* Pate, Trans. Amer. Ent. Soc., LXIII, p. 115, pl. 8, fig. 10, (head). [♀; Canyon of the Cache la Poudre, 20 miles west of Fort Collins, Colorado.]

The following material of this species is now before me.

BRITISH COLUMBIA: 1♀; (No other data); [Mus. Comp. Zoöl.].

OREGON: 1♀; Four miles south of La Grande, Union County; July 18, 1936; (George R. Ferguson); [Ferguson]. 2♀; Vale, Malheur County; elevation, 4400 feet; June 16, 1926; (R. J. Haegele); [U.S.N.M.].

IDAHO: 1♀; Donnelly, Valley County; June 22, 1926; (R. J. Haegele); [U.S.N.M.].

COLORADO: 15♀; near Pearl, Jackson County; August 15, 1926; (Grace A. Sandhouse); [U.S.N.M.].

Distribution.—The present species is a northern intermontane plateau form, ranging from the foothills of the southern Rocky Mountains westward into the Columbia Plateau region and as far north as British Columbia. The southern limits of its range are still unknown.

Pulverro costano Pate

1937. *Pulverro costano* Pate, Trans. Amer. Ent. Soc., LXIII, p. 116, pl. 8, fig. 6 (head). [♀; Santa Clara County, California.]

In the collection sent to me by Dr. Timberlake is the following unreported material of this species.

CALIFORNIA: 2♀; Santa Clara County; (C. F. Baker). 1♀; Puente Hills,[39] Los Angeles County; May 9, 1926; (P. H. Timberlake; on *Phacelia distans* [Wild Heliotrope]). 1♀; Puente Hills[39]; May 10, 1936; (P. H. Timberlake; on *Malvastrum fasciculatum* [Bushmallow]). 1♀; Altadena, Los Angeles County; June 28, 1935; (P. H. Timberlake). [All Timberlake.]

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[40] Andreas Canyon is a side canyon of Palm Canyon, about five miles south of Palm Springs. [*Cf.* U.S. Geol. Surv. Water-Supply Pap. 490-A, p. 77 & pl. 6, (1920).]

Distribution.—The present species is apparently a late vernal to early aestival form rather generally distributed throughout the ranges and valleys of the Pacific coast and Los Angeles regions of southern California.

Pulverro chumashano Pate (Pl. XVI, fig. 24.)

1937. *Pulverro chumashano* Pate, Trans. Amer. Ent. Soc., LXIII, p. 118, pl. 8, fig. 7, (head), pl. 9, fig. 20, (mandible). [♂; Lompoc, California.]

This distinctive little species has been known hitherto only in the male sex. In the additional material of this species now before me there is a female which is described below.

The female of *chumashano* has the superficial habitus of that sex of *colorado*, agreeing with it in the glabrous and nitidous clypeal disc, the absence of a frontal keel and the presence of only two furrows (the notauli) anteriorly on the mesonotum. However, the female sex of the present species is distinguishable from *colorado* by the indistinctly beaded medio-apical margin of the clypeus, by the absence of temporal ammochaetae, by the more rounded anterior margin of the mesonotum in dorsal aspect, and by the irregular radiating carinulae on the dorsal face of the propodeum.

Allotype.—♀; Santa Paula, Ventura County, California. June 5, 1927. (P. H. Timberlake; on *Salvia mellifera* [Black Sage]). [Academy of Natural Sciences of Philadelphia].

Female.—3 mm. long. Black; palpi and mandibles eburneous, apices of latter rufous; scapes and tegulae brunneous; clypeus medio-apically and labrum badeous; pedicel, flagellum, fore tibiae entirely, middle and hind tibiae annulate at base and apex, and all tarsi, luteous. Wings clear hyaline; stigma and veins brunneous.

Head fulgid; front and vertex with a very fine and inconspicuous, sparse and scattered puberulent aeneous pubescence; lateral lobes of clypeus with longer appressed silvery pubescence, the disc glabrous. Eyes truncate below, reaching bases of mandibles, inner orbits subparallel, slightly arcuate. Front and vertex with very fine acupuncturation superposed on a microscopic reticulate aciculation; the front flat, with a tumid median longitudinal area medially below separating the shallow concave antennal scrobes of each side. Antennae short, situated as in male, reaching but little beyond the occiput; scape short, straight, obterete, about one-third the length of eyes; pedicel cylindrical, subequal in length to first two flagellar segments combined; flagellum finely puberulent, subclavate apically, last article simple, terete, subequal in length to two preceding segments combined. Clypeus transverse, subfusiform, length medially about three-eighths that of eye and produced medially into a short broad truncate lobe, the apical margin of which is distinctly beaded and furnished subapically with a row of declivent ammochaetae; clypeal disc strongly tumid, glabrous, nitidous save for a few large scattered punctures. Labrum narrow, linear, transverse, apex entire, latero-distal angles rounded. Mandibles simple, as in male but without the projecting tooth on the lower ventral margin. Temples subnitidous, glabrous, ammochaetae absent.

Thorax subfulgid; mesonotum, scutellum, postscutellum and prepectus with fine short sparse suberect subaeneous puberulent pubescence, pleura ventrally and sternum even more sparsely clothed with similar silvery pubescence. Pronotum narrow, linear, transverse, situated much below level of mesonotum and narrower than it; tubercles almost attaining the tegulae. Mesonotum with moderately fine and fairly close puncturation, anteriorly slightly overhanging the pronotum, in dorsal aspect not as strongly biangulate anteriorly as in male; notauli distinct on anterior fourth; suture between mesonotum and scutellum impressed and consute; scutellum and postscutellum punctured like mesonotum but more sparsely so. Mesopleura with prepectus very sparsely and minutely acupunctate, below wing bases to the strong episternaulus obscurely horizontally striate, otherwise subnitidous; metapleura microscopically obgranulate. Propodeum glabrous, subfulgid, basically obscurely obgranulate; dorsal face with a number of widely separated carinulae radiating from anterior margin and irregularly connected with one another by many fine rugulae which give surface an irregular reticulate aspect, the posterior margin edged by a distinct strong transverse carinula; lateral faces horizontally to obliquely striate with minute acupunctures between the striae; posterior face finely reticulate along lateral margins, remainder obgranulate, medially with a poorly defined elongate lyriform fovea. Legs as in male; fore tarsi with a weak pecten.

Abdomen sessile, subfusiform, subnitidous with obscure transverse aciculation, not constricted between the segments; first two tergites glabrous, the remaining tergites and sternites sparsely pubescent; last tergite with a trigonal pygidium which is one and one-fourth times as long as broad at base, lateral margins sinuate, apex narrowly truncate, disc flat, slightly tumid medially at base, glabrous, nitidous save for a few scattered punctures.

Remarks.—When this species was originally described I intimated that when the female was known *Pulverro chumashano* might prove subgenerically discrete from the other typical *Pulverrones*. However, the female of *chumashano*, like that sex of the Vierecki Group of *Ammoplanops*, lacks the projecting tooth on the lower margin of the mandibles which is such a characteristic feature of the males and consequently I feel there is no justification for erecting a separate subgenus for the reception of this form, although there is no doubt in my mind that the present species forms a distinct species group quite apart from the other forms of the genus.

Specimens examined: 8; 7 males, 1 female.

CALIFORNIA: 2♂; Lompoc, Santa Barbara County; September 9, 1908; (J. C. Bradley); [*type*, Cornell]. 5♂, 1♀; Santa Paula, Ventura County; June 5, 1927; (P. H. Timberlake; on *Salvia mellifera* [Black Sage] and *Brassica incana*); [P. H. Timberlake; *allotype*, A.N.S.P.].

Distribution.—The additional material now before me still supports my original thesis that this aestival form is confined largely if not wholly to the coastal strip of lower southern California.

EXPLANATION OF PLATES

PLATE XV

Fig. 1.—Anterior aspect of head of female *Timberlakena* (*Riparena*) *cahuilla* new subgenus and species.

Fig. 2.—Anterior aspect of head of male *Timberlakena* (*Riparena*) *cahuilla* new subgenus and species.

Fig. 3.—Anterior aspect of head of male *Ammoplanops cressoni* new species.

Fig. 4.—Anterior aspect of head of female *Timberlakena* (*Mohavena*) *yucaipa* new subgenus and species.

Fig. 5.—Anterior aspect of head of male *Timberlakena* (*Mohavena*) *yucaipa* new subgenus and species.

Fig. 6.—Anterior aspect of head of female *Pulverro serrano* Pate.

Fig. 7.—Anterior aspect of head of female *Timberlakena* (*Timberlakena*) *nolcha nolcha* new genus and species.

Fig. 8.—Anterior aspect of head of male *Timberlakena* (*Timberlakena*) *nolcha nolcha* new genus and species.

Fig. 9—Anterior aspect of head of female *Timberlakena* (*Timberlakena*) *ocha* new genus and species.

Fig. 10.—Anterior aspect of head of male *Ammoplanops vierecki* new species.

Fig. 11.—Anterior aspect of head of male *Ammoplanops timberlakei* new species.

Fig. 12.—Anterior aspect of head of male *Ammoplanops foxi* new species.

PLATE XVI

Fig. 13.—Fore and hind wings of *Timberlakena* (*Mohavena*) *yucaipa* new subgenus and species.

Fig. 14.—Fore and hind wings of *Timberlakena* (*Riparena*) *cahuilla* new subgenus and species.

Fig. 15.—Fore and hind wings of *Timberlakena* (*Timberlakena*) *nolcha nolcha* new genus and species.

Fig. 16.—Fore wing of *Timberlakena* (*Timberlakena*) *ocha* new genus and species.

Fig. 17.—Ventral aspect of mandible of male *Ammoplanops foxi* new species.

Fig. 18.—Oblique ventral-anterior aspect of mandible of male *Ammoplanops foxi* new species.

Fig. 19.—Ventral aspect of mandible of male *Ammoplanops vierecki* new species.

Fig. 20.—Ventral aspect of mandible of male *Ammoplanops timberlakei* new species.

Fig. 21.—Ventral aspect of hypopygium of male *Ammoplanops cressoni* new species.

Fig. 22.—Ventral aspect of hypopygium of male *Ammoplanops vierecki* new species.

Fig. 23.—Ventral aspect of hypopygium of male *Ammoplanops timberlakei* new species.

Fig. 24.—Anterior aspect of head of female *Pulverro chumashano* Pate.

Fig. 25.—Lateral aspect of head of male *Ammoplanops ashmeadi* new species.

A STUDY OF THE SPECIES OF HISPINAE BELONGING TO THE GENUS STENOPODIUS WITH DESCRIPTIONS OF NEW SPECIES

(COLEOPTERA: CHRYSOMELIDAE)

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(Plates XVII to XIX)

In 1937, Mr. E. P. Van Duzee collected a series of a species of *Stenopodius* Horn, which on comparison with the genotype species *Stenopodius flavidus* Horn has been observed to possess a number of distinctive characters, that differentiate it as a new species. An examination of the material in the Entomological Laboratory of the Museum of the California Academy of Sciences, reveals that other new species must also be recognized.

In 1883, Dr. Geo. Horn created the Genus *Stenopodius* and placed it in the group Stenopodiides,[1] after the manner of Dr. F. Chapuis.[2] LeConte and Horn[3] associated the genus with *Stenispa*, *Odontota* and *Microrhopala*, in the Tribe Hispini. In the Leng Catalogue *Stenopodius* is placed in the Subfamily Hispinae, Tribe Uroplatini. Dr. Horn considered *Stenopodius flavidus* a most interesting addition to the Tribe and, gave differential characters as follows: "Antennae very short and clavate; third tarsal segments not bilobed at apex, the fourth long and the claws divergent." He viewed the assemblage of characters as unique and remarks: " The structure of the tarsi has nothing approaching it as far as known among the Phytophaga, except *Haemonia*." He queries: " Can it be possible that the present insect is subaquatic in its habits in the manner of that genus? "

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[1] Trans. Amer. Ent. Soc., x, p. 290, (July, 1883).

[2] Lacordaire, Gen. Col. xl, p. 263, (1875). (Phytophages.)

[3] Smith. Misc. Coll. 507, p. 355, (1883). (Class. Col. Amer. N. Mex.)

"Prof. J. B. Smith[4] wrote concerning "Horn's suggestion that *Stenopodius flavidus* has a subaquatic mode of life from certain structural characters: As apical thoracic margin with a depression each side, apparently for the reception of the antennal club; tarsi not dilated, slender, claw-joint extremely long." "We would least expect such a mode of life."

Prof. H. F. Wickham[5] agrees with Prof. Smith as regards the correctness of Dr. Horn's surmise that the species is subaquatic and, states that he took two specimens from a low plant—one of the Malvaceae—at least three miles from water, which makes the possibility of their being subaquatic very doubtful.

The author took a species, identified by Henry Ulke as *flavidus* Horn, from a malvaceous shrub in Poway Valley, San Diego County, California, a long way from water. The region being semi-arid and located twenty-six miles north-east of San Diego city and, fourteen to seventeen miles inland from Del Mar on the coast. The species do not usually occur near water, which is generally scarce in the regions that they inhabit and when near, it is in small amounts in creek beds or springs; when occurring near larger bodies of water, it is probably the food plant that attracts them.

Dr. F. Chapuis[6] in defining the Groupe XVI, Octotomites, states: "Antennae courtes, claviformes, composees de 7 ou 8 articles."

J. S. Baly[7] remarks: "Through the kindness of Dr. Horn received a specimen of *Stenopodius flavidus* of that author. It belongs to the present section of the Family and stands close to *Brachycoryna*. It agrees with that genus in possessing very short antennae, but differs in the produced anterior margin of the thorax and, in the greater number of punctate-striae on its elytra" (p. 90). The section of the Family referred to is: "** Elytra seriate-punctate; interspaces plane or costate. Subsection: (a) Antennae not longer than the head and thorax together, 4 or 5 upper joints forming a distinct club" (p. 89). In a foot note he says: "*Stenopodius flavidus* Horn,[8] a remarkable species, possessing a similarly shaped thorax to *Euxema*;[9] but judging from the structure of its antennae and, from the slight description given of its labium, it should belong to the second section (p. 87) of the Family and be placed near *Uroplata*."

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[4] Ent. Amer., v, p. 122, (June, 1889).

[5] Ent. Amer. vi, p. 52, (March, 1890).

[6] Lacordaire, Gen. Col. xi, p. 310, (1875). (Phytophages.)

[7] Biol. Centr., Col., vi, Pt. 2, pp. 89 and 90, (1885-1894).

Much has been learned in the past few years regarding the distribution of the species. As at present known they inhabit Southern California as far north as Inyo County, as far east as Arizona and El Paso, Texas; southward to Brownsville, Texas, as well as on San Francisco Island in the Gulf of California, Mexico. Mr. Baly[7] believes that "they will sooner or later be found in Central America."

The collectors who have secured the series of specimens at hand are: Mr. J. O. Martin collected in April, 1927, in the vicinity of El Paso, Texas; Mr. C. R. Platt at Lake Elsinore, in July, 1934, Riverside County, California; E. P. Van Duzee at Blythe, May, 1937, also Soboba Springs, in Riverside County, California, and on San Francisco Island, Gulf of California, Mexico, May, 1921. Mr. George Beyer and Charles F. A. Schaeffer at Esperanza Ranch, Brownsville, Texas, August, 1904. Mr. A. T. McClay secured a large series in March, 1932, near Fillmore, Ventura County, and at Elsinore, Riverside County, May 1932; at San Fernando and other localities in Los Angeles County, May, 1935, also at Highlands, San Bernardino County, in May, 1932, all in California.

The author is particularly indebted to the American Entomological Society and the Academy of Natural Sciences of Philadelphia through Mr. E. T. Cresson, Jr., for the loan of six specimens from the Horn collection, one being a paratype. To Mr. A. T. McClay for the loan of 309 specimens and, to Mr. A. R. Mead for specimens from the Leng collection which he had obtained by purchase.

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[8] Biol. Centr.-Amer., Col., vi, Pt. 2, p. 1, (Jan., 1885).

[9] One species, *Euxema insignis* Baly, occurs in State of Panama and has filiform antennae. Biol. Centr.-Amer., Col., vi, Pt. 2, p. 3, (1885).

STENOPODIUS Horn

Stenopodius Horn, Trans. Amer. Ent. Soc., x, p. 301, (1883). Ws. Verh. Nat. Ver. Brunn, xlix, p. 145, (1910). Coleopt. Catalogus, Pars 35; Hispinae, pp. 31 and 90, (1911).

Head small, vertex not prominent, front vertical. Labrum variable in length depending on the degree of retraction or protrusion (Pl. XVIII, fig. 9 G and pl. XIX, fig. 9 D), transversely oblong, apical margin broadly and slightly sinuate, narrowly deflexed. Mentum narrow and elongate (Horn). Palpi slender, last segment of the maxillaries longer than the preceding united. Eyes large and oval, facets small and numerous. Antennae clavate, short, extending but a short distance behind the apical margin of the pronotum when the head is fully retracted and, in normal repose resting on the blackish marginal crescentiform areas; funicle of seven segments, club oval and pointed at apex, apparently consisting of three or possibly four segments very closely articulated, sutures indicated by circular lines of denser whitish pubescence (Pl. XIX, figs. 4, 10, 11 and 12).

Pronotum broader than long (Pl. XVII, figs. 1 to 8), apex more or less briefly prolonged (lobed) at middle and sinuate each side, or very moderately arcuate from angle to angle; true apical angles small and usually more or less strongly deflexed beneath the apparent angles, rarely visible from above and separated from the apparent angles by a fovea (Horn) (Pl. XIX, fig. 5 I); sides never strongly arcuate, straight or nearly so, parallel or very moderately convergent to apex and continuous with the curve of the apparent angles; base wider than apex, broadly lobed (Pl. XVII, fig. 6), slightly and broadly sinuate laterally, briefly over-lapped by the base of each elytron, except at middle opposite to the scutellum (Pl. XVIII, fig. 3); the latter subquadrate, somewhat prominent apically and declivous basally, apex truncate, feebly arcuate or slightly emarginate.

Elytra oblong-oval (Pl. XVIII, figs. 1, 2 and 3), about one-half longer than wide; sides parallel and broadly rounded in apical one-fourth to the small apical angles and slightly dehiscent at the suture. Each elytron at base slightly explanate, their margins more or less irregularly arcuate, briefly over-lapping the pronotal base as stated above, the inner two-thirds of each margin with a narrow and more or less evident, smooth and feebly tumescent area or callus (Pl. XIX, fig. 8 C), the outer one-third somewhat sinuate over the basal pronotal angles, thence continuous with the lateral margins from the small and obtuse basal angles of the elytra beneath the humeri; lateral and apical margins more or less narrowly explanate and with diaphanous lunate spaces or not, the marginal beading more or less irregularly serrulate; humeri large and somewhat prominent, rather flattened on the disk. Each elytron 10 or 8-striate (Pl. XVIII, figs. 4 and 5), in the former case the punctures of the sixth and seventh striae are irregular between the fifth and eighth striae; the third, fifth and ninth intervals usually widest, plane or more or less convex, especially apically

(Pl. XVIII, fig. 6); the ninth interval may be narrowly prominent or subcarinate and more or less irregularly crenulate (Pl. XVIII, fig. 4 A), most so apically, scarcely so basally; when 8-striate the intervals three, five and seven are distinctly widest and more or less plane; the wider intervals render the striae geminate. Punctures large, circular and more or less ocellate when the epiderm of the superior surface is more or less translucent as in freshly collected specimens, or coarse in small depressions when the epiderm is opaque.

Legs moderate in length and stoutness, glabrous. Metafemora slightly longer than their tibia. Tarsi (Pl. XVIII, fig. 11) not dilated and with pale silken hairs beneath; first three segments nearly equal in length, the third emarginate above with the inferior apical margin truncate, fourth as long as the others together, slightly arched, with the sides of apex angularly laminate at the inferior angles (Pl. XVIII, fig. 11 H). Claws feebly arcuate, in adduction and in repose received between the laminate sides of the segment, or when fully extended and abducted rest on or across the edges of the laminae.

GENOTYPE: *Stenopodius flavidus* Horn. (By monotypy.)

Genotype locality: Southern California.

In all known species the pronotum, elytra and legs are pale yellow in the living and freshly collected museum specimens, in old specimens and those collected in alcohol the color is darker yellow and more or less opaque. The epipleurae are wide and of equal width throughout, except beneath the humeri where they are slightly wider, quite horizontal; usually pale, sometimes varied with brown; in one species deep black, especially at base beneath the humeri.

The under surface of the body, head and antennae are usually very deep black, sometimes with a bluish tinge; frequently varied with rufo-piceous, especially the abdominal segments, the pygidium is always pale; the fifth ventral segment is nearly always pale at apex, and yellow maculae may be present laterally on the fifth, fourth and third segments. The head is entirely black in one species, in all of the others the vertex is more or less yellow, frequently more or less tinged with rufous (luteous); the yellow is divided on the median plane by a narrow impressed and more or less blackish line. In occasional specimens the integuments are entirely pale, except that the sterna and hypopleurae are more or less pale rufous, these are evidently individuals in which there has been an inhibition or arrest of pigmentation, or immature and the color albo-flavous, the integuments softer and show warping. The first three segments of the tarsi are usually varied with rufo-piceous and, the apical one-fourth of the terminal segments are nearly alway deep black with the basal three-fourths pale yellow. .

The blackish crescentiform areas of the pronotal apex are really translucent, depending for their color on the underlying vertex or occiput of the head. When the head is retracted the yellow of the vertex renders the marginal areas pale (Pl. XVIII, fig. 9), or when the head is extended and deflexed the black of the occiput shows through the translucent margin, providing in either case that the epiderm is not opaque as mentioned above. In one species the pronotal apex is not lobed at middle, ·the margin being arcuate from angle to angle; in another the yellow of the disk simulates a lobe which extends forward but only partially dividing the black of the apical margin (Pl. XVII, fig. 2 C).

The feebly tumescent area or callus of each elytral base referred to above in the generic definition, varies in width antero-posteriorly, from narrow and bead-like in part of the species (Pl. XVII, figs. 5 and 8) or wider (Pl. XVII, fig. 4 E); these areas are usually evident, but not alway defined nor tumescent, they are part of the slightly reflexed basal margin of each elytron.

Dr. Horn's figure[10] of the genotype species shows very faithfully the general appearance of the species, the number and arrangement of the elytral striae in particular. The student should note carefully the confused punctures between the fifth and eighth striae, that in the posterior one-half of the area that the sixth and seventh striae are evident from the regularity of the punctures. This is true to Nature and verifies the statement that each elytron is 10-striate.

The secondary sexual characters are obscurely defined: The male is generally smaller and narrower than the female, the antennae sligthly stouter and the club somewhat more robust and the apex of the fifth ventral abdominal segment slightly more arcuately sinuate. The female·conversely is usually larger and broader, the antennae slightly less robust and a little longer, the club slightly longer, but it must be remembered that the club in both sexes is slightly compressed, so not to mistake the narrow side for the broader one. A small female can scarcely be recognized from a large male by the characters mentioned above.

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[10] Trans. Amer. Ent. Soc., x, pl. 9, fig. 8, (July, 1883).

The following terms descriptive of color has been used in accordance with encyclopaedic definitions: Flavous.—Perfectly yellow, without intermixture of red or brown. Luteous.—Golden yellow, more generally mixed with a tinge of red or brown; in the extreme approaching the color of saffron or yolk of an egg.

Synopsis of the Species

A. Pronotal apex with a median and more or less anteriorly prominent prolongation or lobe, the apical margin each side sinuate and the marginal blackish area crescentiform in outline, and more or less impressed between the lobe and the apparent angles, the true apical angles deflexed beneath the apparent angles and wholly invisible from above. Vertex of head more or less yellow. Pronotum quadrate. Elytra 10-striate, sixth and seventh striae confused; epipleurae always pale beneath the humeri.

  B. Sides of pronotum moderately arcuate and subparallel in basal two-thirds, apical lobe prominent anteriorly, apparent angles slightly prominent and well rounded (Pl. XVII, fig. 3). Antennae stout and moderately short. Elytra immaculate, unless very faint cloudy spots that are rarely present are such; ninth interval subacutely prominent and irregularly crenulate (Pl. XVIII, fig. 1). Tarsi more or less black, except basal two-thirds of fourth segments which are pale. San Diego, Riverside and Ventura (at Fillmore) Counties, California ....1. *flavidus* Horn

  B. Sides of pronotum convergent from base to apex, straight to very feebly arcuate.

    C. Apparent angles feebly prominent, slightly tumid; apical lobe distinctly prominent, the margin more oblique and sinuate laterally; the blackish crescentiform areas more or less broadly limiting the yellow of the lobe. Pronotal punctures moderately small in rather deep oval depressions, which show some coalescence, somewhat involving the posterior margins of the crescentiform areas, intervals not longitudinally rugose. Each elytron usually with indications of five or fewer blackish macules (Pl. XVIII, fig. 3); discal punctures large but smaller than in *flavidus*, those of the ninth and tenth striae moderate in size and subequal, those of the tenth less perforate; intervals rather equal, plane or slightly prominent posteriorly, the ninth feebly prominent toward apex. Elsinore, Riverside county and San Fernando, Los Angeles County, California ....2. *submaculatus* new species

a. Form larger and broader. Color opaque above and dull golden yellow; beneath similarly pale to luteo-piceous. Pronotum two-sevenths wider at base than long; apical lobe rather broad, with sides feebly, obliquely and broadly sinuate, giving the apical margin a broadly angulate appearance; crescentiform areas narrow, marginal, translucent to blackish. Elytral punctures small, striae not well defined; intervals subequal, slightly prominent apically, ninth feebly crenulate apically. Elsinore, California ....3. var. *laticollis* new variety

b. Average size of a male *submaculatus*. Color above, vertex of head and legs pale flavous; beneath rufo-piceous, greater part of head, antennae and apical fourth of fourth tarsal segments black. Pronotum opaque, one-third wider than long; apex as in *laticollis* but entirely pale; sides more convergent and feebly arcuate; punctures rather coarse, moderately indented, viewed obliquely the intervals appear reticulate, denser against the base, centrally more widely spaced with few very small punctules. Elytral striae not sharply defined, punctures large; intervals 3, 5 and 9 slightly wider, very feebly convex, not prominent apically; punctures of ninth striae small, those of the tenth large and subperforate. Elsinore, California.
4. var. *pallidulus* new variety

C. Size large as in *flavidus* Horn and sometimes slightly maculate. Body black beneath. Antennae stout, third segment elongate and slightly obconical. Pronotal median apical lobe varies with the sex: *Female.*—Lobe small and triangular, feebly prominent, lateral sinuations feeble and oblique, the crescentiform areas narrow and slightly impressed; apparent angles slightly tumid and not prominent, broadly rounded; pronotal sides slightly convergent and noticeably arcuate. *Male.*—Apical lobe larger and parallel, lateral sinuations stronger, crescentiform areas wider and more impressed; apparent angles larger, slightly prominent and less broadly rounded. In both sexes the pronotal disk is moderately convex, punctures somewhat coarse, rather dense, each in a large impression, intervals very narrow; impressions more or less coalescent anteriorly rendering the surface very irregular. Elytral striae less strongly marked, punctures large and well impressed; intervals 3, 5 and 9 slightly wider, the latter crenulate over the punctures of the ninth striae; marginal bead more or less serrulate. Bishop, Inyo County, California.
5. *inyoensis* new species

c. Size as in *inyoensis,* entirely pale, except that the antennae and prothoracic sides more or less dark rufo-piceous and the sterna more or less rufous. Type, a female. Bishop, Inyo County, California ....6. var. *pallidus* new variety

B. Sides of the pronotum straight and convergent from base to apex.

Apparent angles rather prominent, blackish crescentiform areas more or less strongly impressed, the impressions extending backward a short distance onto the disk; elytra immaculate. Scutellum pale. Distal segments of the abdomen more or less suffused with rufous. Tarsi flavo-piceous. El Paso, Texas.
7. *martini* new species

Size moderately small. Median apical lobe narrower, its yellow color more parallel; lateral sinuations deep. Blackish crescentiform areas very strongly impressed, rendering the apical lobe and apparent angles more prominent anteriorly than in any other species. Pronotal sides slightly convergent in about basal one-eighth, thence parallel and not arcuate, except in apical one-fourth. First four elytral striae regular and paired, intervals 3 and 5 wider becoming gradually slightly convex apically; ninth interval prominent and moderately convex, not distinctly crenulate; marginal bead obsoletely serrulate. Pronotal disk more or less longitudinally rugulose between the coalescent dents basad to the crescentiform areas. Scutellum pale. Brownsville, Texas.
8. *texanus* Schaeffer

A. Pronotal apical margin more or less moderately arcuate and not interrupted by a median prolongation or lobe.

Pronotal apex without evidence of a median lobe; apical blackish marginal area transverse and entire, its posterior margin slightly and evenly arcuate; apparent angles absolete. Pronotum quadrate. Head entirely black and with a distinct bluish tinge; epipleurae pale throughout; elytra 8-striate, striae paired. Blythe, Riverside County and Inyo County, California ....9. *vanduzeei* new species

Pronotal apical margin more strongly arcuate, a median prolongation of discal yellow, simulating a lobe, is present, wholly within the margin and but partially dividing the black marginal area; apparent angles present but not prominent and well rounded. Vertex of head with two small dot-like reddish-yellow maculae. Epipleurae at base deep black beneath the humeri. Elytra 10-striate, sixth and seventh striae confused; a blackish macula across the suture at summit of the apical declivity. San Francisco Island, Gulf of California, Mexico and Arizona ....10. *insularis* new species

On account of part of the species of *Stenopodius* Horn differing more in details than well marked characters, the author deems it necessary to make the synopsis more comprehensive than usual so that it can be used more satisfactorily for the identification of the species. *Vanduzeei, insularis, martini* and *texanus* have good differential characters; the first two could readily be mistaken for species of *Brachycoryna* Baly, if the third segment of the tarsi were not examined. *Flavidus* Horn has good characters *per se* but, has to be carefully differentiated from *submaculatus* and *inyoensis*, where details of structure must be relied upon, as there is marked variation in the individuals of each species.

Flavidus Horn is the largest species and more distinct, while *submaculatus* is nearly as large and in the majority of individuals there are five or fewer, more or less distinct blackish maculae on each elytron and, the color is usually paler, the epiderm more translucent. *Flavidus* may show very slight tendency to elytral maculation, but the maculae are very obscure and evanescent, about seventy-five per cent of the specimens being entirely immaculate. In *inyoensis* there is a tendency to sexual divergence and to pallescence.

The tendency of the epiderm to vary according to the method of collecting — in alcohol or cyanide — is a factor that renders determination more difficult. In the recognition of variation there is a problem involved, regarding immaturity or of arrested pigmentation. In those individuals which are the most pallid and the integuments less firm, the apical third or one-fourth of the fourth tarsal segments are alway deep black when collected, next in order are the head-capsule, antennae and mouth-parts; the vertex of the head is normally pale in most of the species and the mouth-parts rufous to more or less rufo-piceous; it appears that the parapleurae darken more rapidly than the sterna, when these parts are fully pigmented the abdominal segments are the last to darken, the color varying from flavous to luteous as defined above in the introductory remarks. In the fully matured individuals the fifth abdominal segment is normally pale at the apical margin; the pygidium is normally pale. The sequence or order of pigmentation as indicated above points to a physiological significance.

It is evident that much more material must be studied from other geographical regions, even to Central America as J. S. Baly has suggested, before specific limitation can be satisfactorily interpreted.

Stenopodius flavidus Horn

Stenopodius flavidus Horn, Trans. Amer. Ent. Soc., x, p. 301, pl. 9, fig. 8, (1883). Baly, J. S., Biol. Centr.-Amer., vi, 2, p. 90, (1886). Smith, J. B., Ent. Amer., v, p. 122, (1889). Wickham, H. F., Ent. Amer., vi, p. 52, (1890).

Form oblong and slightly ovate, twice as long as wide, shorter and more robust than any species belonging to the other genera of the Hispinae that inhabit our fauna (Horn). Head black with vertex more or less yellow, antennae and body beneath deep black, shining, without distinct bluish tinge; apical margin of fifth abdominal segment more or less reddish-yellow and, a paler yellow macula each side, also present on the fourth segment, rarely on the third. Pronotum and propleurae, elytra and epipleurae, pygidium and legs, pale to a deeper yellow. First three segments of the tarsi more or less rufopiceous, fourth black in apical one-third, pale in basal two-thirds. Elytra immaculate in all of the specimens known to the author.

Antennae short (Pl. XIX, fig. 4) but longer than in either *vanduzeei* or *insularis*, extending a short distance beyond the apical pronotal margin, depending on the degree of extension of the head; first segment subglobular, second as long as wide, both slightly larger than those that follow; segments three to six inclusive cylindrical and equal in width, third slightly longer than wide and very slightly narrowing from apex to base, the three following as long as wide; seventh larger, obconical, about one-half wider at apex than at base, sides straight; club slightly compressed, shorter to slightly longer according to sex.

Pronotum about a fourth wider than long (Pl. XVII, fig. 3), apex prolonged at middle, the lobe slightly elevated and feebly tumescent and well rounded at tip, in width about equal to one-fourth of the apex; apical margin each side sinuate betwee nthe lobe and apparent angles, the adjacent discal surface more or less black and crescentiform in outline; the apparent apical angles slightly prominent and rounded; the true angles strongly deflexed (Pl. XIX, fig. 5 J), small, separated from the apparent angles by a more or less deep triangular fovea and invisible from above. Sides subparallel, moderately arcuate, most so in apical third and continuous with the curve of the angles, marginal beads more or less brownish or blackish and terminating at the true apical angles; base broadly arcuate in middle two-fourths, thence slightly and broadly sinuate to the blunt subrectangular basal angles, which are usually obscured by the elytral base. Disk moderately convex, the apical black crescentiform areas limiting the yellow of the apparent angles which may be slightly tumid; punctation rather dense, punctures much smaller than those of the elytra, in irregular depressions which show some coalescence, surface irregular, punctures sparser apically, lobe and apparent angles impunctate; laterally in the submarginal areas about six black dots are usually present parallel to the beads.

Elytra distinctly wider than the prothorax, oblong-oval (Pl. XVIII, fig. 1), about one-half longer than wide; base of each elytron arcuately diverging from the suture (Pl. XVIII, fig. 8 I) contiguous to the scutellum and beneath its apical angles, thence arcuately and briefly over-lapping the pronotal base, becoming slightly sinuate over the pronotal base angles to the obtuse basal angles of the elytra; sides subparallel, broadly and arcuately converging in apical one-fourth to the sutural angles, margin rather widely explanate and more or less diaphanous, bead serrulate, serrules irregularly spaced. Disk moderately convex, arcuately and rather gradually declivous in about apical one-fourth, sides more rapidly declivous from the ninth interval and impressed behind the humeri; 10-striae (Pl. XVIII, fig. 4), punctures large and more or less ocellate, first four series paired, punctures of the sixth and seventh striae confused, except behind the middle where they are evident[11] between the fifth and eighth striae, often confused throughout, ninth and tenth striae regular, punctures of the ninth stria smaller apically, those of the tenth large and more or less perforate; intervals in large part plane, third and fifth a little wider, slightly prominent apically, ninth somewhat acutely prominent especially apically where it receives the other wider and slightly convex intervals, and there becoming irregularly crenulate, this more or less prominent interval renders the declivous lateral surface somewhat concave between it and the margin; the surface of the tenth interval is more or less tumescent and attains the margin between the punctures of the tenth stria (Pl. XIX, fig. 1), which lie opposite the diaphanous crescentic spaces when present. Scutellum moderate in size, more or less pale, apex slightly arcuate, less declivous basally; angles more or less over-lapping the contiguous elytral margins.

Abdomen finely punctate, each puncture with a very small hair. Prosternum coarsely punctate and with small depressions; mes-episternal and met-episternal lateral angles minutely prominent.

Measurements.—Length 4.5 to 5 mm.; width 2 to 2.5 mm.

Type.—Cal[ifornia]; [Horn Collection, American Entomological Society, type no. 3881].

Paratype.—1; California; [Horn collection, American Entomological Society, no. 3881.2].

256 specimens have been studied: Two from the Horn collection, American Entomological Society; six from Poway and San Diego, San Diego County, collection of the author and, one in the Fenyes collection, California Academy of Sciences; 247 specimens collected near Fillmore, Ventura County, California, March 30, 1932, collection of Mr. A. T. McClay, who has consented that ten specimens be deposited in the collection of the American Entomological Society.

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[11] See Trans. Amer. Ent. Soc., x, pl. 60, fig. 8, (1883).

Stenopodius submaculatus new species

Size quite similar to that of *flavidus* Horn, but apparently a little smaller on the average, above very pale yellow, elytra shorter; vertex of the head pale to darker yellow, otherwise black without bluish tinge; antennae and body beneath deep black, sometimes the sterna may show some reddish-yellow; pygidium pale, fifth ventral abdominal segment pale at apex, with a paler yellow macule at the sides, sometimes present on the fourth and third segments but smaller in size. Legs pale, femora very narrowly blackish at base, trochanters black to rufo-piceous; tarsi more or less dark rufo-piceous, except basal two-thirds of the fourth segment which is paler, the apical one-third black.

Antennae (Pl. XIX, fig. 10) moderately stout, a little less elongate than in *flavidus* Horn, first and second segments a little more robust than those that follow, the second as long as wide; third slightly elongate, subobconical and about one-fifth longer than wide at apex, segments three to six inclusive with their surfaces less longitudinally arcuate, the fourth about as long as wide, fifth and sixth noticeably so and feebly wider at apex than at base; seventh larger and obconical, sides arcuate and one-half wider at apex than long; club oval, obtusely pointed at apex, slightly compressed (Pl. XIX, fig. 10 E).

Pronotum (Pl. XVII, fig. 4) subquadrate, base about one-third wider than long and one-fourth wider than apex; median prolongation of apex distinctly prominent anteriorly, sides more oblique and less sinuate (Pl. XVII, fig. 4 D), apparent angles scarcely prominent and rather narrowly rounded; submarginal blackish crescentiform areas noticeably impressed, more or less broadly limiting the yellow of the lobe and very narrowingly margining its apex. Pronotal sides quite straight, convergent from base to apex, becoming arcuate in about apical one-fourth and continuous with the curve of the apparent angles; lateral marginal beads fine and blackish, terminating as usual at the true angles, the latter small as well as the foveae which are triangular and rather deep. Disk moderately convex, punctures moderately small, in more or less rounded or oval depressions, sparser and less impressed anteriorly, intervals slightly convex, lobe impunctate; in the lateral submarginal areas a few black dots are usually present. Propleurae narrowly pale.

Elytra (Pl. XVIII, fig. 3) moderately arcuate from side to side, apical declivity gradually so; sides quite strongly impressed behind the humeri; basal margin (Pl. XIX, fig. 3) of each elytron more evenly arcuate, the callous margin narrow and not well defined; lateral margins narrower, more or less diaphanous, bead serrulate. Discal punctures coarse, striae not well defined, intervals rather equal and moderately narrow so that there appears to be a more even distribution of the punctures, those of the ninth and tenth series are subequal in size, the tenth much less perforate. The ninth interval is slightly more convex and somewhat irregular, viewed longitudinally from behind the third and fifth intervals appear somewhat wider and slightly prominent. Elytra maculate in the typical form (Pl. XVIII, fig. 3) with five small blackish macules on each elytron. Epipleurae pale. Scutellum blackish to brownish, slightly transverse, convex apically and declivous basally.

Measurements.—(Types.) Length 4 to 4.5 mm.; width 2 to 2.5 mm.

Holotype.—Female; Lake Elsinore, Riverside County, California; July 8, 1934: (G. R. Platt); [Van Dyke collection, California Academy of Sciences, no. 4576].

Allotype.—Male; with same data; [Van Dyke Collection, Cal. Acad. Sci., no. 4577].

Paratypes.—24; with same data; Distributed: Van Dyke colln., 14; Colln. American Entomological Society, 2; Colln. A. T. McClay, 8.

Thirty-four specimens studied. Distribution. — California: Elsinore and Highlands, Riverside County; San Fernando, Los Angeles County; Silver Canyon, White Mts., Inyo County.

Stenopodius submaculatus var. **laticollis** new variety

Specimens studied slightly larger and broader than the average size of typical *submaculatus.* Color above dull golden-yellow and opaque; body beneath similarly pale to luteo-piceous; head black with vertex pale, antennae and apical one-fourth of fourth tarsal segments black. Pronotum about two-sevenths wider at base than long; apical lobe rather broad with lateral margins feebly, obliquely and broadly sinuate, giving the apical margin a broadly angulate appearance, crescentiform areas narrow, marginal and translucent to blackish; sides slightly convergent and noticeably arcuate.

Elytral punctures not ocellate, moderately small, most so basally and laterally, rather more widely spaced in the series than usual rendering the striae less well defined; intervals subequal, slightly prominent apically, the ninth feebly crenulate apicad; punctures of the ninth striae noticeably smaller; margins moderately broad, bead serrulate, serrules obsolete basad.

Measurements.—(Type.) Length 4 mm.; width 2.5 mm.

Type.—Female; Elsinore, Riverside County, California; May 13, 1931; (A. T. McClay); [Author's collection, California Academy of Sciences, no. 4676].

Paratypes.—5; with same data; Distributed: Colln. California Academy of Sciences, 2; Colln. A. T. McClay, 2; Colln. American Entomological Society, 1.

Stenopodius submaculatus var. pallidulus new variety

Average size of a male *submaculatus*. Color above, vertex of head and legs pale flavous; body beneath more or less dark rufo-piceous; greater part of head, antennae and apical one-fourth of fourth tarsal segments black; first three segments of tarsi rufo-piceous.

Pronotum opaque in the type, at base one-third wider than long, apical lobe not included; apex as in *laticollis*, but entirely pale; sides more convergent anteriorly and feebly arcuate; punctures of disk rather coarse, moderately indented, viewed obliquely the intervals appear reticulate, those of the base forming a submarginal row, centrally more widely spaced and with scattered very fine punctules.

Elytral striae not sharply defined, punctures quite large, separated by a distance equal to their diameters; intervals 3, 5 and 9 slightly wider, very feebly convex, not prominent apically; punctures of the ninth striae small, those of the tenth large and subperforate; marginal bead irregularly serrulate, serrules smaller and subobsolete basad. Apex of fifth ventral segment margined with luteous; pale macules present laterally on both the fifth and fourth segments.

Measurements.—(Type.) Length 3.75 mm.; width 2 mm.

Type.—Male; Elsinore, Riverside County, California; May 3, 1932; (A. T. McClay); [Author's collection, California Academy of Sciences, no. 4677].

Paratypes.—10: with same data, 2; San Fernando, Los Angeles County, California, 8. Distributed: Author's Collection, Calif. Acad. Sci., 5; Colln. A. T. McClay, 3; Colln. American Entomological Society, 2.

Stenopodius inyoensis new species

In size and pronotal outline in the male, *inyoensis* resembles *flavidus* Horn, but differs in the character of the pronotal apex in the female as follows: Apical lobe smaller, narrower and triangular, the lateral sinuations are feeble and the crescentiform areas much smaller, the apparent angles being scarcely at all prominent; the elytral punctures in the para-scutellar area are small and those of the ninth striae are smaller than those of the tenth; the ninth intervals are prominent, being convex and undulate and not sharply crenulate; the pronotal impressions are larger and deeper apically and the surface more irregular; the abdomen is more or less rufo-piceous and the fifth segment rufous with the apex luteous. In *flavidus* Horn the ventral surface is

deep black, the apex of the fifth segment and the lateral maculae pale; also, the punctures of the ninth and tenth striae are large and equal in size, the ninth intervals are distinctly prominent and irregularly crenulate.

Size about the same as that of *flavidus* Horn. Body above, propleurae, epipleurae and legs flavous; head black with vertex luteous and the mouthparts more or less rufous; beneath more or less deep black, with the ventral segments often dark rufo-piceous, the fifth luteous and paler at apex and laterally, the fourth rufous and also paler apically with macula each side, the third may have evidence of pale lateral maculae. Femora very narrowly rufous at base, trochanters rufous. Tarsi more or less rufo-piceous; fourth segment with apical one-third black as usual and the basal two-thirds paler.

Antennae (Pl. XIX, fig. 11) moderately stout, less so than in *flavidus;* segments one and two a little more robust than those which follow, the third slightly longer than wide and feebly subobconical; the fourth, fifth and sixth equal in size and as long as wide, with the seventh obconical, about one-half wider at apex than at base and quite as long as the third, club subovate.

Pronotum widest at base, where it is about one-third wider than the apex and almost equal to the length. Slightly different in the sexes: *Female.*—Median apical lobe comparatively small and triangular (Pl. XVII, fig. 5), slightly more prominent than the margin, which is feebly sinuate laterally, crescentiform blackish areas short (narrow) and attaining the apex of the lobe. *Male.*—Median lobe broader (Pl. XVII, fig. 6), well rounded at apex and moderately prominent, apical margin each side more strongly sinuate, crescentiform darker areas larger and rendering the yellow color of the lobe more parallel; apparent angles somewhat prominent and slightly tumid, the true angles and foveae small, the latter shallow and triangular. Disk moderately convex, more or less arcuately declivous in about lateral fifth, marginal bead fine, pale or blackish; punctures moderately small in rather large and moderately deep depressions which render the surface more or less irregular; laterally within the margin small black dots may be present or absent.

Elytra rather plane basally between the large and somewhat prominent humeri, thence the surface is moderately convex and arcuately declivous apically and laterally; punctures of the striae regular, large and more or less ocellate, smaller basally in the para-scutellar area, those of the sixth and seventh striae confused as usual; intervals three and five wider, flat, becoming slightly prominent on the apical declivity; ninth interval noticeably prominent, convex and undulate; ninth and tenth striae scarcely visible from above on account of the lateral declinate surface, but viewed from the side the punctures of the ninth striae are smaller than those of the tenth, the latter being more or less perforate; margins quite narrow and diaphanous, lunules scarcely evident, bead rather feebly serrulate in the male and obsoletely so in the female.

Measurements.—(Types.) Length 4 to 5 mm.; width 2 to 2.5 mm.

Holotype.—Female; Bishop, Inyo County, California; June 15, 1905; [Fenyes colln., California Academy of Sciences, no. 4617].

Allotype.—Male; with same data; [Fenyes colln., Cal. Acad. Sci., no. 4618].

No paratypes.

One specimen from the same locality is worthy of being described as a variety as follows:

Stenopodius inyoensis var. **pallidus** new variety

Similar to the female of *inyoensis* in size, but pale luteous throughout, except that the prothoracic sides are dark rufopiceous and the sterna paler rufous; the antennal clubs and apical one-fourth of the fourth tarsal segments deep black.

Type.—Female; Bishop, Inyo County, California; June 25, 1916: [Fenyes collection, California Academy of Sciences, no. 4619].

Stenopodius martini new species

Martini is to be differentiated by the following characters: The lateral sinuations of the pronotal apex are stronger and the crescentiform areas more strongly impressed, somewhat as in *texanus* Schaeffer; the surface of the pronotal disk just behind the crescentic areas is more or less longitudinally rugose, due to the dents being more elongate and the punctures somewhat coalescent and, the intervals longitudinally prominent and convex, the rugae show most distinctly when the epiderm is opaque, its translucency obscures the details. Propleurae more widely yellow than in *flavidus*, *inyoensis* and *submaculatus*. Abdomen more persistently rufo-piceous. Elytra less convex and the intervals less conspicuous for their width or prominence.

Size of *flavidus* Horn. Head black, vertex pale, mouth-parts more or less rufo-piceous. Antennae (Pl. XIX, fig. 12) rather slender, distinctly more elongate than in *vanduzeei;* segments one and two less robust, slightly longer than in *flavidus* and more like the third, the latter about one-half longer than wide at apex; segments four, five and six as long as wide; seventh subobconical, length equal to width of apex and as long as the third.

Pronotum (Pl. XVII, fig. 7) widest at base where it is about one-third wider than long not including the apical lobe; the latter well developed and somewhat narrower than in *flavidus;* apical margin lateral to the lobe rather strongly sinuate, the blackish crescentiform areas quite strongly impressed, the impressions extending a short distance backward on the disk and, the posterior margins of the areas more irregular; apparent angles feebly prominent and slightly tumid; sides nearly straight and noticeably convergent anteriorly, feebly arcuate and becoming more strongly so with the curve of the apparent angles, marginal beads very fine and more or less blackish; base broadly arcuate in middle third, thence broadly sinuate to the obtuse angles, and usually covered by the base of each elytron, except opposite the scutellum. Disk transversely convex, most so apically, in about lateral one-fifth more arcuately declivous to the beads; punctures moderately small and not very evident in the irregular dents that are more elongate in about apical third; intervals variable in convexity, and more or less longitudinally rugose anteriorly where the punctures are somewhat coalescent in the elongate dents; at base opposite the scutellum the surface is somewhat impressed and laterally close to the beads a few black dots may be present. Propleurae more widely pale than in *flavidus* Horn.

Elytra immaculate, punctures large, first four striae paired, the fifth and eighth more or less involved in the confusion of the punctures of the sixth and seventh; intervals more or less plane, becoming slightly convex and prominent behind the middle, the ninth not very prominent, but gradually, feebly and irregularly subcarinate toward apex. Disk slightly convex and gradually arcuately declivous in apical one-third; basally each elytron is slightly impressed and the margins feebly reflexed over the pronotal base; laterally feebly declivous from the ninth interval; margins very narrow, becoming slightly wider apically behind the middle and more or less diaphanous, marginal bead feebly serrulate apically, obsoletely so basally. Scutellum pale.

Abdominal segments more or less rufo-piceous, the fifth quite rufous with margin yellowish and the pale macules present laterally. Trochanters and tarsal segments rufo-piceous, distal one-fourth of the fourth black and pale basally as usual. The small lateral mes-episternal and met-episternal processes distinct.

Measurements.—(Types.) Length 4 mm.; width 2 to 2.1 mm.

Holotype.—Female: El Paso, Texas; April 27, 1927; (J. O. Martin); [Colln. California Academy of Sciences, no. 4580].

Allotype.—Male; with same data; [Colln. Cal. Acad. Sci., no. 4581].

Paratypes.—16; with same data. Distributed: Colln. Cal. Acad. Sci., 12; Colln. American Entomological Society, 4.

Stenopodius texanus Schaeffer

Stenopodius texanus Schaeffer, Pan-Pacific Ent., IX, p. 106, (1933).

Texanus Schaeffer is quite unique in the characters of the pronotal apex: The median lobe is well developed and lateral to it the margin is deeply sinuate, the apparent angles are but a little less prominent than the lobe; the crescentiform areas are strongly impressed; pronotal sides are very briefly and rather strongly convergent at base, thence straight and parallel becoming moderately convergent in about apical one-fourth. Mr. Schaeffer's description is brief and concise.

Texanus was first described by Schaeffer as a variety of *flavidus* Horn as follows:

> "Same coloration, form, sculpture of prothorax and elytra as in typical *flavidus*, but slightly smaller, the median prothoracic lobe at anterior margin narrower, the impression between the latter and lateral angles deeper and darker colored, causing the anterior angles and the narrower median lobe to appear more prominent. The ante-scutellar basal lobe is rather indistinct. Length 3.5 mm."

In the three specimens of *texanus* Schaeffer examined critically, the vertex of the head is yellow and the mouth-parts more or less rufous. The antennae are stout and rather short, third segment but slightly longer than either one of the three following, subequal to the second or first which are noticeably more robust; club short oval and obtusely pointed at apex.

The median apical lobe of the pronotum is comparatively narrow, its apex evenly rounded, each side the margin is more deeply sinuate than usual and the apparent angles nearly as prominent as the median lobe (Pl. XVII, fig. 8); the crescentiform and more or less blackish areas are deeply impressed, their posterior border quite semi-circularly arcuate. The apparent angles are well rounded apically and distinctly tumid; the true angles are small and invisible from above as usual; the foveae rather deep and triangular beneath the abrupt lateral margins of the apparent angles. The pronotal sides in basal fifth are more distinctly convergent, thence parallel, becoming slightly arcuate and feebly convergent in about apical one-third; marginal beads fine, more or less dark and terminating as usual at the true angles.

Elytral disk quite plane in the basal area, thence moderately convex, arcuately declivous apically and the sides rather abruptly declivous from the ninth intervals. The first four punctate striae are regular, punctures of the sixth and seventh striae are confused as usual between the fifth and eighth series, the punctures of the latter two are quite regular in arrangement. Intervals three and five wider and feebly convex apicad; ninth prominent and moderately convex, subcrenulate over and about the punctures of the ninth striae, best seen when viewed obliquely from the side and from behind in line with the longitudinal axis of the body; punctures of the ninth striae small, those of the tenth larger and subperforate, both series contiguous. Lateral margin narrow, serrules obsolete. Scutellum small and pale.

Body black beneath. Fifth abdominal segment rufous apically; lateral yellow macules present on the fifth and fourth segments. Fourth tarsal segments black in apical one-fourth as usual.

Measurements.—Length 3.5 to 4 mm.; width 1.5 mm.

Type.—In the Schaeffer collection.

Three specimens: One from the Fenyes collection, California Academy of Sciences; collected on Esperanza Ranch, Brownsville, Texas, August, 1904 (Geo. Beyer collector). One specimen in the Horn collection, American Entomological Society, H 7092, also taken near Brownsville, Texas. One specimen in the collection of A. R. Mead, from the Leng collection by purchase, collected on Esperanza Ranch, Brownsville, Texas, August, 1904. The handwriting is similar on all of the labels and all undoubtedly taken by Mr. Geo. Beyer.

In the specimens examined the superior surface of the body is opaque yellow. Mr. Schaeffer writes that "A small number of specimens were collected by the late Ottomar Dietz and his self." "They were taken by sweeping in and around old and neglected cotton fields."

Stenopodius vanduzeei new species

Vanduzeei differs from all of the other known species, except *insularis* in having the apical pronotal margin moderately arcuate from angle to angle, without the slightest evidence of a median prolongation and, by each elytron having but eight striae of punctures.

In *insularis* the pronotal apical margin is rather more strongly arcuate, without a median prolongation; the marginal black area is partly divided by a process of the discal yellow, simulating a median lobe and, besides the elytra are each 10 punctato-striate, the sixth and seventh series of punctures being confused as in the other species.

Vanduzeei is the nearest approach to the species of *Brachycoryna* Baly. In the latter the apex of the third tarsal segments are distinctly bilobed; the antennae are clavate in both *Stenopodius* Horn and *Brachycoryna* Baly.

Size smaller than in the other species. Head and antennae entirely black with a bluish tinge, mouth-parts frequently slightly rufous; pronotum and elytra pale flavous, propleurae rather widely so; elytra usually immaculate, occasionally brownish maculae may be slightly evident behind the middle, epipleurae entirely pale or feebly brownish; ventral surface more or less deep black, sterna somewhat varied with rufo-piceous. Abdominal segments suffused with rufous, the fifth palest. Legs pale as usual, base of femora, knees and apical margin of tibiae briefly brownish, coxae piceous; first three segments of tarsi blackish, fourth segment black in apical one-fourth with basal three-fourths pale.

Frons and vertex of head rather coarsely punctate, gular and temporal regions smooth, polished and impunctate, except for a row of elongate punctures against the posterior border of the eyes. Labrum (Pl. XIX, fig. 9) transversely oblong, sides rounded and the apex broadly emarginate, short when retracted (Pl. XVIII, fig. 9). Antennae (Pl. XIX, fig. 7) shorter than in *flavidus* Horn and moderately stout; first and second segments about as long as wide, more robust than the following four; third slightly longer than wide, fourth and fifth cylindrical and as long as wide, sixth similar in length with apex very slightly wider than base; seventh segment larger, truncately subobconical, apex one-third wider than base; club oval subelongate and about as long as the four preceding segments together.

Pronotum about one-fifth wider than long (Pl. XVII, fig. 1), subquadrate; apex slightly and evenly arcuate in moderate circular arc, true angles small, gradually deflexed and sometimes slightly visible from above, apparent angles and foveae obsolete (Pl. XIX, fig. 6 A), as viewed obliquely from the side); from above the apical margin appears continuously arcuate with the sides, the latter subparallel, feebly arcuate and in apical one-fourth a little more strongly so, marginal beads fine brownish or blackish in color. Disk convex, apical one-seventh uninterruptedly blackish, the posterior margin of the area slightly arcuate and limited by a row of coarse punctures; laterally in the submarginal area a row of black dots may be present or more or less absent; punctures rather small, not dense and located in impressions which vary in form, those more apically placed rather elongate; base broadly but not strongly arcuate in middle three-fifths, thence sinuate to the subrectangular and blunt angles, margin beveled for that of the elytral base.

Elytra oblong-oval, one-third longer than wide. Base of each elytron rather strongly and evenly arcuate to opposite the fifth interval, thence slightly sinuate over the basal pronotal angles to be subangulately continuous with the lateral margin, slightly reflexed and briefly over-lapping the pronotal base, except opposite to the scutellum; humeri large, quite plane dorsally with margins broadly rounded. Disk moderately convex, slightly, broadly impressed basally, rather declivous laterally from the rather prominent seventh interval (Pl. XVIII, fig. 6), arcuately so apically; eight punctato-striate (Pl. XVIII, fig. 5), striae regular and paired, punctures large, circular, distinct and more or less ocellate; intervals three, five and seven plane toward base and gradually, slightly more prominent apically (Pl. XVIII, fig. 6), the seventh rather irregularly subcrenulate, most so posteriorly; punctures of the seventh series smaller than those on the disk, those of the eighth not large nor perforate (Pl. XIX, fig. 3); sides parallel, arcuately rounding in apical one-fourth to the sutural angles, quite strongly impressed behind the humeri, margins narrow, more or less diaphanous behind the middle, beads obsoletely serrulate. Scutellum comparatively small, convex apically and declivous basally, apex very slightly emarginate, sometimes pseudo-dentate at middle from exposure of the underlying black surface between the diverging sutural margins of the elytra, apical angles scarcely over-lapping the contiguous elytral margins.

Abdomen finely and sparsely punctate, each puncture with a very small hair. Prosternum irregularly sculptured and with an arcuate row of subapical coarse punctures. Mes-episternal and met-episternal processes distinct. Legs rather short, femora and tibiae nearly equal in length; tarsi three-fifths as long as their tibia, inferior and laminate apical angles of the terminal segments less developed.

Measurements.—(Types.) Length 3.5 to 4 mm.; width 2 to 2.5 mm.

Holotype.—Female; Blythe, Riverside County, California; May 12, 1937; (E. P. Van Duzee); [Colln. California Academy of Sciences, no. 4578].

Allotype.—Male: with same data: [Cal. Acad. Sci., no. 4579].

Paratypes.—16, with same data as types; one collected by Dr. E. C. Van Dyke, at Mt. Kearsarge, Inyo County, California. Distributed: Colln. California Academy Sciences, 12; Colln. American Entomological Society, 2; Colln. A. R. Mead, 1, obtained by purchase from the Leng collection, collected at Winslow, Ariz.

Stenopodius insularis new species

The most evident differential characters are the black, transverse and arcuate pronotal apex, the blackish area partially interrupted at middle by a lobe of discal yellow (Pl. XVII, fig. 2 C) simulating the anteriorly prominent median lobe of *flavidus* Horn; epipleurae deep black beneath the humeri, this character is unique and the dark macula across the elytral suture at summit of the apical declivity. The angles of the scutellum slightly overlap the contiguous sutural margins of the elytra as they diverge and, often the underlying black is exposed, giving the appearance that the apex is denticulate at middle.

Size moderately large and quite similar to that of *flavidus* Horn. Pronotum and elytra flavous. Head, antennae and under surface of body deep black with a more or less bluish tinge. Vertex of head with two reddish-yellow or luteous dot-like macules. Propleurae more or less narrowly pale. A brownish or darker macula across the suture at summit of the apical declivity of the elytra; epipleurae black, especially at base beneath the humeri. Scutellum piceous or varied with yellow. Legs pale as usual, trochanters more or less rufo-piceous; tarsal segments more or less reddish, fourth segment pale with apical one-fourth black.

Head: Labrum frequently reddish at the sides. Antennal funicle glabrous and sparsely punctate, first two segments more densely so; club shorter and more robust, slightly compressed as usual.

Pronotum subquadrate (Pl. XVII, fig. 2), about one-sixth wider than long; the apical dark marginal area transverse and not impressed, but partially interrupted on the median line by a lobe of discal yellow that does not attain the apical margin, the resulting subcrescentiform area each side with a few coarse punctures within each posterior margin, surface smooth; discal surface of each apparent angle not tumid; the true angles deflexed as usual and not visible from above, small and process-like, the foveae small and triangular; sides parallel, becoming arcuate apically, not or noticeably convergent anteriorly, marginal beads fine and irregularly blackish; base slightly wider than apex, broadly arcuate and slightly sinuate laterally, angles subrectangular and blunt, rather narrowly overlapped, except opposite the scutellum, by the irregularly arcuate base of each elytron. Disk moderately convex, irregularly punctate, punctures rather small, not well defined in irregular shallow impressions; laterally against the marginal bead, six or fewer black dot-like maculae are usually present.

Elytra one-half longer than wide (Pl. XVIII, fig. 2), moderately convex on the disk and, more or less arcuately declivous laterally and apically; alternate intervals between the striae not prominent. Each elytral base irregularly arcuate and narrowly explanate over the pronotal base, slightly sinuate laterally over the angles, thence subangulately continuous with the lateral margin; sides arcuate beneath the humeri, thence broadly sinuate to become parallel, in apical one-fourth broadly arcuate to the sutural angles, the latter very small, margin invisible beneath the humeri when viewed from above; the declivous sides behind the humeri rather strongly impressed. Disk moderately convex, strial punctures large and circular, each within an irregularly oval impression rendering the intervals narrow and more or less reticulate; alternate intervals not noticeably wider; first four striae well defined, the fifth, eighth and ninth less so, punctures of the sixth and seventh confused but at times somewhat striate, those of the tenth or submarginal series large and perforate (Pl. XIX, fig. 2), the surface between the punctures more or less tumid. Margins narrowly explanate, with diaphanous crescentic spaces opposite to the punctures, the marginal bead rather evenly serrulate, serrules irregular as to size. Ninth interval not noticeably prominent nor crenulate against the striae of punctures. Scutellum subquadrate, prominent apically and declivous basally, feebly emarginate at apex and blackish in color.

Abdominal segments more or less suffused with rufous, the fifth distinctly so and with the fourth having a pale yellow macula laterally. Anterior lateral angle of the met-episternum forming a small projecting point, that of the mes-episternum broader and flat.

Measurements.—(Types.) Length 4 to 4.5 mm.; width 1.8 to 2 mm.

Holotype.—Female; San Francisco Island, Gulf of California, Mexico; May 30, 1921; (E. P. Van Duzee); [Colln. California Academy of Sciences, no. 4574].

Allotype.—Male; with same data; [Colln. Cal. Acad. Sci., no. 4575].

Paratypes.—4; 3 with same data, Colln. Cal. Acad. Sci.; 1, Dome, Yuma County, Arizona, (Rehn and Hebard), alt. 190 ft., Sept. 11, 1934, Colln. Acad. Nat. Sci. Phila.

Mr. Van Duzee states that the species occurs on *Hibiscus denudatus*.

EXPLANATION OF PLATES

PLATE XVII

Fig. 1.—Pronotum of *Stenopodius vanduzeei* new species. Viewed from above: A, apex more or less truncato-arcuate in moderate circular arc, true apical angles slightly visible from above, foveae and apparent angles not present. Female; Blythe, California.

Fig. 2.—Pronotum of *Stenopodius insularis* new species. Apex moderately arcuate: B, apparent apical angle, the true angles and foveae not visible from above; C, median prolongation of the yellow color of the disk, partly interrupting the blackish area. Male; San Francisco Island, Gulf of California, Mexico.

Fig. 3.—Pronotum of *Stenopodius flavidus* Horn. Median prolongation or lobe of apex prominent anteriorly, completely interrupting the blackish border, margin sinuate each side; blackish areas crescentiform, apparent angles more or less moderately prominent. Southern California.

Fig. 4.—Pronotum of *Stenopodius submaculatus* new species. D, median lobe distinctly prominent anteriorly, apparent angles scarcely prominent, sinuations more oblique; prolongation of the discal yellow more parallel; pronotal sides straight and convergent anteriorly, scarcely arcuate; E, base of each elytron briefly overlapping the pronotal base and with a subfusiform smooth marginal area, which is more or less defined and very feebly tumescent. Female; Lake Elsinore, Riverside County, California.

Fig. 5.—Pronotum of *Stenopodius inyoensis* new species. Median apical lobe small and subtriangular, sinuations feeble, apparent angles not prominent. Female; Bishop, Inyo County, California.

Fig. 6.—Pronotum of *Stenopodius inyoensis* new species. Median apical lobe larger and rather prominent, sinuations moderate and the apparent angles more or less moderately prominent. Male.

Fig. 7.—Pronotum of *Stenopodius martini* new species. Median apical lobe distinctly prominent anteriorly, sinuations well marked, apparent angles moderately prominent; pronotal sides quite straight and convergent from base to the rounded apparent angles. El Paso, Texas.

Fig. 8.—Pronotum of *Stenopodius texanus* Schaeffer. Median apical lobe and apparent angles almost equally prominent, sinuations strong; pronotal sides briefly convergent at base, thence distinctly parallel, very slightly arcuate, apparent angles more broadly rounded. Male; Brownsville, Texas.

PLATE XVIII

Fig. 1.—Elytra of *Stenopodius flavidus* Horn. Female.

Fig. 2.—Elytra of *Stenopodius insularis* new species. Female.

Fig. 3.—Elytra of *Stenopodius submaculatus* new species. Female.

Fig. 4.—Right elytron of *Stenopodius flavidus* Horn, female, showing punctation of 10 series, the sixth and seventh series confused, more or less involving the fifth and eighth: A, ninth interval more or less prominent, irregularly crenulate in relation with the ninth series of punctures, the surface lateral to which is more or less declivous.

Fig. 5.—Right elytron of *Stenopodius vanduzeei* new species, showing 8 paired series of punctures, the third, fifth and seventh intervals widest; elytral surface arcuately declivous laterally.

Fig. 6.—Elytra of *Stenopodius vanduzeei* new species, viewed from behind, showing the third, fifth and seventh intervals more or less convex on the apical declivity.

Fig. 7.—Diagrammatic camera lucida outline of the pronotal apex in the genus *Stenopodius* Horn (genotype), viewed from the front: B, true apical angle; C, median prolongation; D, apparent apex when viewed from above; E, fovea; F, cephalic foramen of the prothorax.

Fig. 8.—Camera lucida outline of the elytral base showing: I, the basal marginal callous areas.

Fig. 9.—Head and pronotum of *Stenopodius flavidus* Horn, showing the antennae in position of repose; G, labrum retracted.

Fig. 10.—Pronotum of *Stenopodius inyoensis* var. *pallidus* new variety. Female.

Fig. 11.—Metatarsus of *Stenopodius vanduzeei* new species, showing the character of the segments; H, laminate and angulate apical margin of the fourth segment.

PLATE XIX

Fig. 1.—Lateral post-humeral elytral margin of *Stenopodius flavidus* Horn, female, showing the ninth and tenth series of punctures, viewed obliquely from the side, the elytral surface between the punctures of the tenth series not or but slightly tumescent, the punctures not strongly perforate; A, apicad.

Fig. 2.—Ditto of *Stenopodius insularis* new species, female. Punctures of the tenth series strongly perforate, the intervening elytral surface distinctly tumescent, overarching the punctures; those of the ninth series smaller.

Fig. 3.—Ditto of *Stenopodius vanduzeei* new species. Lateral elytral surface arcuately declivous; punctures of the seventh and eighth series of equal in size, the intervening surface not or feebly tumescent; marginal bead not or obsoletely serrulate; A, apicad.

Fig. 4.—Left antennae of *Stenopodius flavidus* Horn, female, rather robust. B, ½ mm.

Fig. 5.—Right lateral one-half of the pronotal apex of *Stenopodius flavidus* Horn, viewed obliquely at right angle to the surface showing: F, Median prolongation or lobe of the apical margin; G, crescentic blackish area; H, apparent apical angle; I, fovea; J, true apical angle invisible from above.

Fig. 6.—Ditto of *Stenopodius vanduzeei* new species, female holotype showing: K, true apical angle more or less visible from above; foveae and apparent angles absent.

Fig. 7.—Left antenna of *Stenopodius vanduzeei* new species, female; shorter and less robust than that of *flavidus;* B, ½ mm.

Fig. 8.—Elytral base of *Stenopodius submaculatus* new species, female; C, marginal callous area overlapping pronotal base; scutellum more or less black.

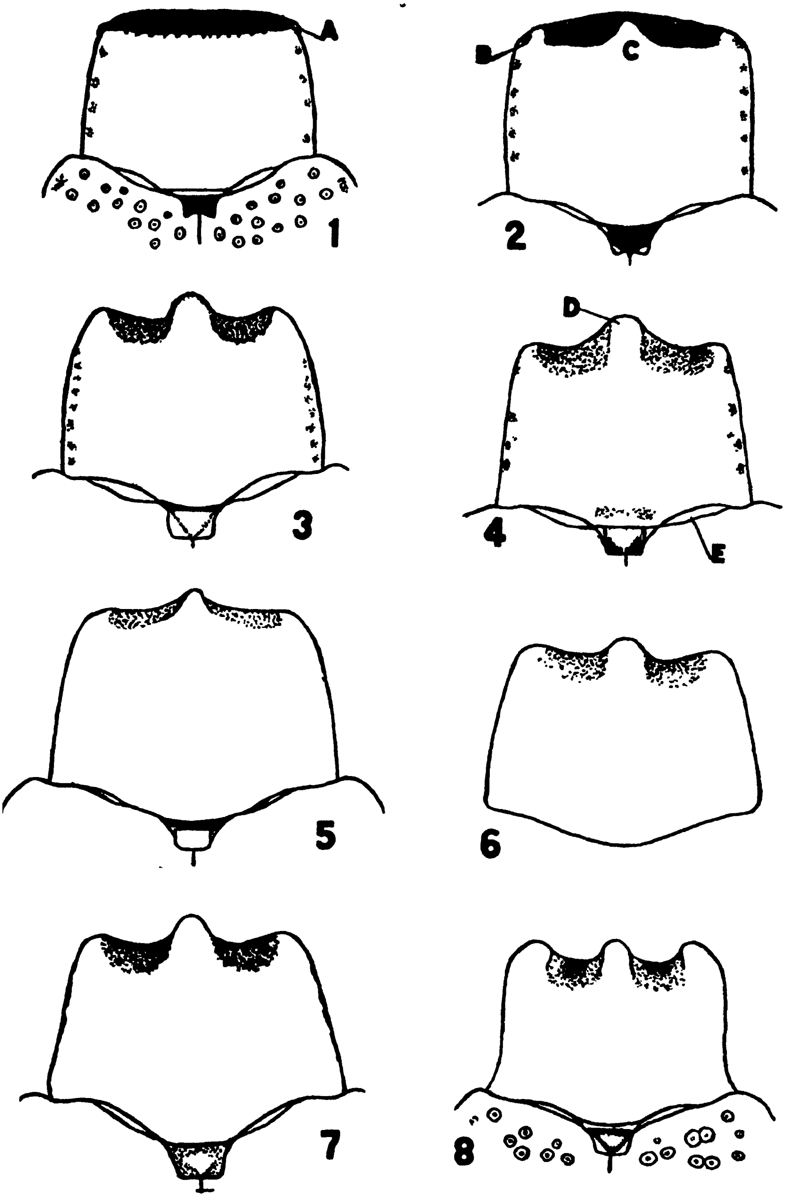
Fig. 9.—Frons of *Stenopodius vanduzeei* new species, female; showing labrum fully extended.

Fig. 10.—Right antenna of *Stenopodius submaculatus* new species, of female holotype, shorter and more robust than in *flavidus* Horn, club not showing the compression, seventh segment of funicle evidently stouter; E, club viewed side-wise showing the compression.

Fig. 11.—Left antennae of *Stenopodius inyoensis* new species, female; more elongate than in *vanduzeei* or *submaculatus*, more slender than in *flavidus;* B, ½ mm.

Fig. 12.—Right antenna of *Stenopodius martini* new species, female; more elongate and slender than in *flavidus* Horn; B, ½ mm.

Fig. 13.—Right protarsus of *Stenopodius vanduzeei* new species, showing the ventral apical margin of the third segment distinctly truncate and not bilobed, same magnification as for the antennae.



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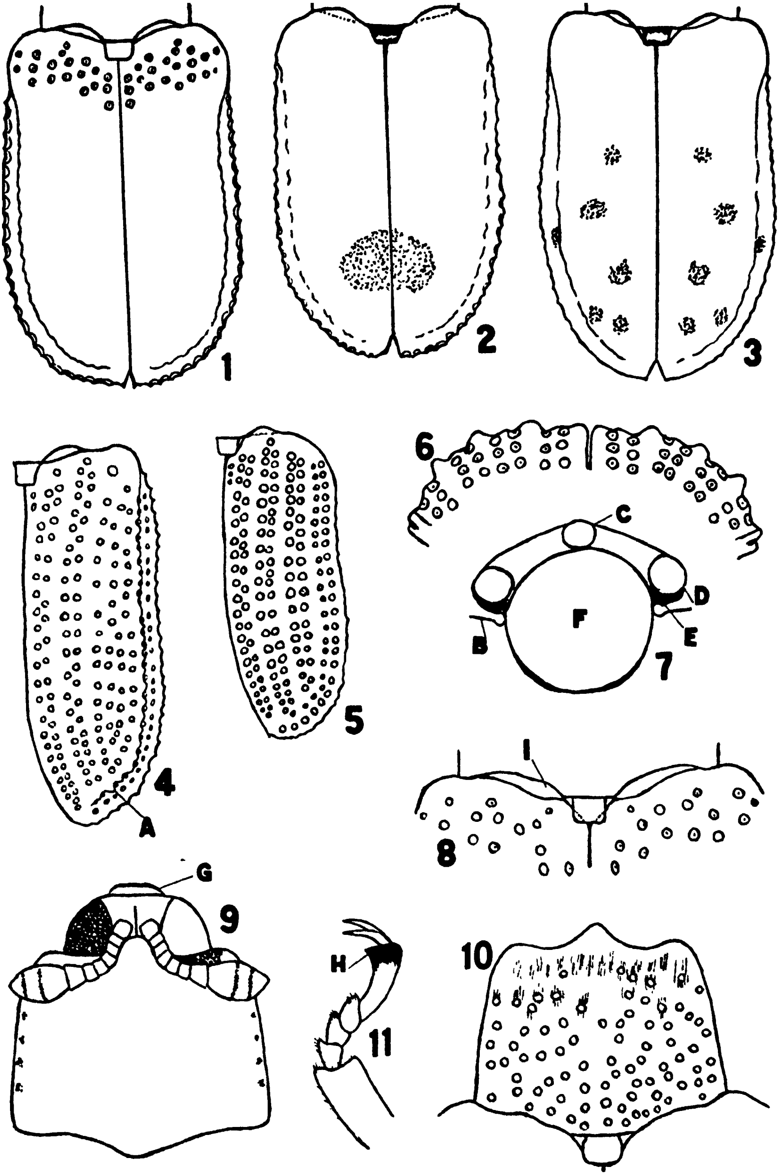

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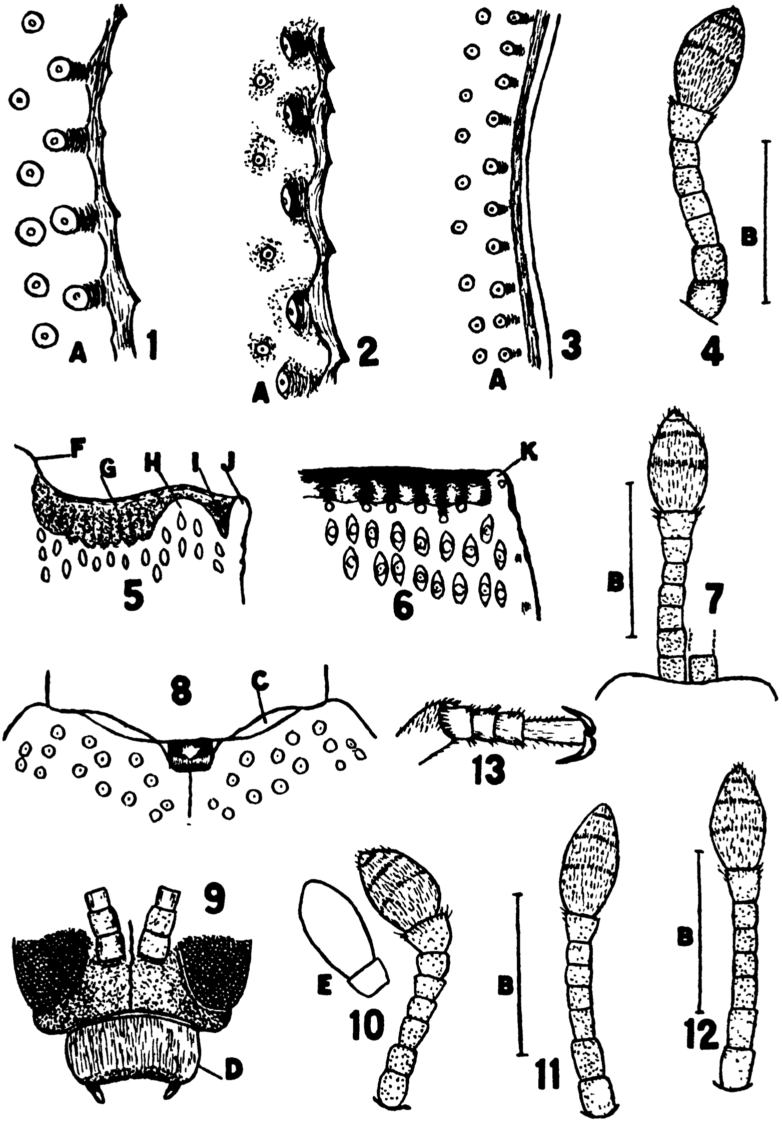

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